MARTIN GARDNER ON H.G. WELLS • AMERICAN HEX SIGNS • GEORGIA BIGFOOT HOAX

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Love at First Sight

The Power of Suggestion?

SEDATING AMERICA'S CHILDREN

Medicine or Abuse?

QUANTUM WEIRDNESS AND ISAAC NEWTON

Skepticism and MORAL PANICS

Science and *Big Foot*prints

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Inquiries from the media and the public about the work of the Committee should be made to Paul Kurtz, Chairman, CSI, P.O. Box 703, Amherst, NY 14226-0703. Tel.: 716-636-1425. Fax: 716-636-1733.

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Editor's Note

Keeping Ahead of the News

We have plenty of riches for you in this issue: five articles, four commentaries, three book reviews, two Forum columns, a revealing Follow-up ("A Mind for Murdergate"), an extensive news section, and our regular columnists. And, as always, one of the liveliest letters sections in all of publishing. It all represents the broad scope, diversity of topics, and informed, independent analysis you have come to expect in SI. From language professor Stephen Bertman's cover article on love at first sight, to Andrew Weiss's condemnation of the overmedication of America's youth; from sociologist Erich Goode's delineation of moral panics, to Michael Dennett's "Science and Footprints" (Dennett has long kept track of Bigfoot trackers and their claims)—plus physicist Paul Quincey's illuminating analogy between the present-day hand-wringing over quantum mechanics' mysteries and what was said about gravity in Isaac Newton's time—I think you'll find much to provoke thought and nourish heart and mind.

* * *

One thing we try to do is keep up with what's topical and in the news. What latest misunderstandings or distortions of scientific information are newly at work in society, impeding what would otherwise be a more rational cultural environment? Often we are ahead of the news. That seems to be the case with the special three-article cover report "Vaccines and Autism: Myths and Misconceptions" in our November/December 2007 issue. Those articles were much praised for their warnings of the medical perils of the rising antivaccination movement. Now comes news of a nationwide outbreak of measles that health officials attribute to rejection of vaccinations. On September 18 a new coalition of twenty-two major medical groups—including the American Medical Association and the American Academy of Pediatrics—warned that public confidence in vaccine safety needs to be restored. Children are getting measles at the highest rate in more than a decade. Nearly half of the cases involve children whose parents rejected vaccination. European countries are experiencing similar outbreaks. The alliance said public-health officials need to counteract campaigns by advocacy groups who contend that vaccines can cause autism despite scientific evidence to the contrary—clearly reported in our articles.

And our May/June 2008 cover article on animal rights extremism puzzled some readers as to its relevance, but news accounts followed of two disturbing firebombings against biomedical researchers, reported in this issue. And so it goes.

* * *

In this space in our July/August issue, I lamented that the proposed science debate among presidential candidates didn't happen despite the central importance of science and technology. Candidates Barack Obama and John McCain did nevertheless eventually respond in writing to fourteen top science questions facing America. You can see their answers side by side at www.sciencedebate2008.com. Useful, but I find them a bit predictable and platitudinous. They are clearly staff-written. You may detect some differences between the candidates (e.g., on stem-cell research) but not what would have come out in a live debate. And, astonishing to me, there were no questions about evolution/creationism!

—Kendrick Frazier

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Georgia Bigfoot Hoax Draws Global Attention

BENJAMIN RADFORD

In early August, Matthew Whitton and Rick Dyer claimed to have found in the northern woods of Georgia something never known to exist: a dead Bigfoot. They claimed to have a body, photos of the body in a freezer, and DNA evidence, which they would reveal at an August 15 press conference in Palo Alto, California.

I heard of the claims a week earlier, and since it seemed a likely fraud, I assumed the issue would die away quietly. Instead, as August 15 approached I was shocked by the level of media interest in the story. People around the globe were following the saga of the Georgia Bigfoot, from the Discovery Channel to the *Kansas City Star* to the *Times* of London. Posts on the monster-hunting Web site Cryptomundo.com gloated that Bigfoot skeptics were about to eat a lot of crow.

I was asked by ABC News to look into the case and reported back with a laundry list of red flags—aspects that suggested that the chances of the new discovery being a breakthrough instead of a hoax were vanishingly small. They included:

A short video clip shown on YouTube featured Whitton and Dyer being interviewed by a taxonomist named Dr. Paul Van Buren. It was later revealed that "Dr. Van Buren" didn't exist and was instead portrayed by Whitton's brother. Whitton admitted that they had faked the interview but claimed that they did it "to give the psychos something to do over the weekend." He said they had received angry messages and death threats since their discovery: "It seems like there are lot [*sic*] of people in the Bigfoot world who are a little delusional."

A second curious detail was how the evidence was being handled. Bigfoot enthusiast Tom Biscardi, who was working with the pair, promised that "Extensive scientific studies will be done on the body by a team of scientists including a molecular biologist, an anthropologist, a paleontologist, and other scientists over the next few months at an undisclosed location" under armed guard. Unnamed experts? Undisclosed location? It sounded more like *The X-Files* than real science.

A photo of the "Bigfoot body" supposedly found by Matthew Whitton and Rick Dyer in northern Georgia. The story made international news before being exposed as a hoax in late August 2008. (Photo credit: /AFP/Getty Images/Newscom from www.searchingforbigfoot.com)

Third, and perhaps most damaging, Tom Biscardi previously claimed he had captured a Bigfoot. On August 19, 2005, Biscardi appeared on the radio show "Coast to Coast with George Noory" and said his group had captured a Bigfoot a week earlier, a male beast that weighed over 400 pounds and stood eight feet tall. He said he would be presenting photos of it several days later. It turned out to be a hoax. In 2005 Biscardi promoted a pay-per-view cable TV show in which he offered viewers the chance to see a Bigfoot captured on live television for only $59.95.

So had a Bigfoot finally been found after all these years? Or was this just the latest hoax to embarrass Bigfoot believers and bring further ridicule to a field sorely in need of science? A few prominent Bigfoot

researchers expressed skepticism, but many in the community clearly thought the Bigfoot smoking gun had been found. The press conference was packed with media from across the country, eagerly awaiting actual proof. A reporter from *Scientific American* asked if I would be attending. I said I'd probably pass, adding, "I think I've seen this before."

Instead of producing a body at the press conference, Biscardi offered photographs of what was later proven to be a Bigfoot costume in a trunk and DNA results from both an opossum and a human. (It's not clear how exactly the analysis would have proven Bigfoot's existence, since there is no comparison specimen; no DNA analysis can definitively identify Bigfoot tissue.)

Most journalists were suitably skeptical, but Whitton, Dyer, and Biscardi stood by their story—at least at first. Within days everything unraveled; Whitton and Dyer admitted the hoax while Biscardi claimed to be the innocent dupe amid a flurry of accusations and counter-accusations. Whitton was soon fired from his job as a police officer and the media circus eventually faded away. Bigfoot believers were left with red faces in the wake of the highest-profile Bigfoot hoax of the last few decades.

—Benjamin Radford

Benjamin Radford is managing editor of SKEPTICAL INQUIRER *and author of "Bigfoot*

Nocturnal Lights and Sounds Baffle Maryland Town . . . for Awhile

For more than two years, residents of Pikesville, Maryland, have been startled awake in the middle of the night by bright flashes and loud explosions. Baltimore Gas and Electric workers checked their equipment and reported everything was in working order. A local weatherman reviewed weather reports and said there were no unusual meteorological events at the time of the incidents. A physicist from the Johns Hopkins Applied Physics Laboratory toured the site and was unable to offer any suggestions. Baltimore County Police set up video cameras and were able to catch on tape what they described as a "bright flash and very loud report" about one hundred yards above the ground. "I have a feeling that if we reposition the cameras, we will be able to identify the source," a police spokesperson stated.

Barbara Friedman, president of the neighborhood community association, praised police for taking their complaints seriously. "The quality of life has been very much disturbed for hundreds of homes," Friedman said. "It's a very strange story."

A local science-fiction fan suggested the cause could be time-travel experiments gone awry. "We believe time travel will eventually be possible," Paul Scheerer said. "I always thought this could possibly be someone trying to beam something back through time and we are just seeing the end result."

Alas, the true cause of the explosions was far more ordinary. The repositioned police cameras showed activity in a condominium building window just prior to an explosion. Police searched the condo unit and found illegal fireworks, as well as twelve handguns, a rifle, two shotguns, an Uzi submachine gun, cocaine, and marijuana. Frederick Lee Mackler, age fifty-nine, was arrested and charged with ten counts, including disturbing the peace, possessing narcotics, reckless endangerment, and concealing a deadly weapon.

Mackler confessed to using a starter pistol to fire "bird bangers" into the courtyard behind his building. (Bird bangers are used by farmers to scare birds and rodents away from crops.) "It wasn't directed at anyone," said a Baltimore County police spokesman. "He just happened to have pyrotechnics and, early in the morning, he would set them off."

Mackler told police he wanted to annoy his neighbors.

He was being held at the Baltimore County Detention Center on one million dollars bail. "I'm not a psychiatrist, but I believe this was a cry for help," his attorney told the judge.

—Bill Vanderlinde

Bill Vanderlinde lives in Columbia, Maryland, and is a member of the National Capital Area Skeptics.

Where's the Responsibility? UK Broadcasting Code Prevents Re-Airing Psychic's Failure

In 1931 Stanley Baldwin, the Tory leader, accused owners of the major British newspapers of exercising "power without responsibility." In doing so, he criticized the major newspapers as being tools for their owner's political agendas and called for responsible reporting of the facts. As the media grow and proliferate, so do their role in educating the masses in other aspects of our life. This includes not only politics but science and the public's understanding of reality. Consequently, governments and media associations have created guidelines intended to aid in balancing viewpoints and prevent offending material from reaching the public. However, some material is not worthy of a "balanced" view, and sometimes broadcasting codes have a negative impact on reporting reality.

Such was the case when the broadcasting codes in the United Kingdom recently silenced Sylvia Browne's most famous false prediction.

Until *The Montel Williams Show* was cancelled, popular psychic Sylvia Browne appeared weekly on it for more than a decade. Each week she told families of missing loved ones about the missing, gave relationship advice, or offered medical recommendations. What viewers did not see was the routine failure of her "prophetic" insight (see, e.g., SI, November/December 2004, March/April 2005, March/April 2006, September/October 2008). That changed in January 2007 when Shawn Hornbeck was found alive after Browne famously told his parents on *Montel* in 2003 that he was dead (see "Sylvia Browne's Biggest Blunder," SI, May/June 2007; "Psychic Reality Check," Anderson Cooper, January 30, 2007).

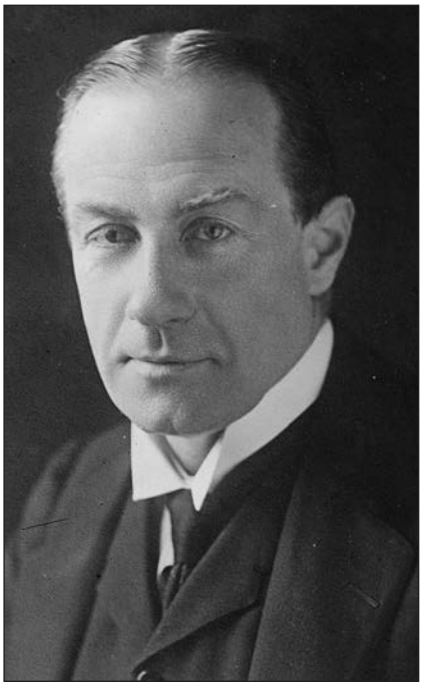
In presenting Browne as a psychic each week without demonstrable proof of her claims, *The Montel Williams Show* fed her celebrity by helping her sell books and giving her legitimacy, which resulted in a half-dozen appearances on the Larry King show on CNN. Montel and King are not the only culprits. NBC airs *Medium*, supposedly "based" on the life of Allison DuBois, the WE channel hosts John Edward, Court TV features *Psychic Detectives*, A&E hosts *Psychic Kids*, and the list goes on. In all of these television shows, not once has any psychic ability been demonstrated in a double-blind test. As with Browne, television feeds the celebrity of the psychics and gains viewers who want to believe in the paranormal.

In all of these television shows, not once has any psychic ability been demonstrated in a double-blind test.

All too often we see "psychics" on television interviewed by the likes of popular and seemingly intelligent hosts. Sometimes a skeptic is included on these shows to offer a "balanced" view. However, should the media provide "balance" to something unproven? I think it would be more responsible for the television producers and interviewers not to give the false impression that there is something to debate, such as paranormal powers, when there is not.

Wanting to believe in the paranormal does not change the reality that there is no scientific proof of psychic ability. That is why television, and indeed other forms of media, must exercise power *with* responsibility. The media have a moral obligation to report with reality-based objectivity. It is not enough to simply attempt to "balance" an interview with an opposing view.

In some countries, moral obligations are reinforced with Broadcasting Codes. In June, the United Kingdom's Office of Communications ruled that ITV2 breached its standards by re-airing the episode when Browne falsely told Hornbeck's parents he was dead (see "ITV Wrong over Psychic Claim Repeat," *The Press Association*, June 23, 2008). Consequently, the show was removed from broadcast rotation. While the standard is meant to prevent "offensive material" from being aired, it also has the negative consequence of preventing the audience from viewing a demonstrably false prediction. In turn, this reinforces the psychic by failing to portray reality.



Stanley Baldwin

For the skeptic, it seems like debating is a losing situation. One can refuse to debate promoters of the paranormal; the audience fails to hear critiques of the claims. Or one can debate and then give the audience the false impression that there is something to debate. There is yet a third option, which rests solely with the producers, media outlet owners, and interviewers: report that despite all the claims, there is no firm evidence that has withstood the scrutiny of laboratory tests (see Ray Hyman, "The Evidence for Psychic Functioning: Claims

vs. Reality," SI, March/April 1996.)

As Carl Sagan recalled (in his book *The Demon-Haunted World*) about a conversation with a man who believed in conspiratorial claims: "Maybe 'Mr. Buckley' should be more skeptical about what's dished out at him by popular culture. But apart from that it's hard to see how it's his fault. He simply accepted what the most widely available and accessible sources of information claimed as true." Sagan concluded, "For his naivetè, he was systematically misled and bamboozled." Indeed, as with Mr. Buckley and the public in general, they should be more skeptical. But equally important is that those with the power to disseminate information, such as interviewers, producers, and media owners, be responsible in offering a fact-based reality.

—Ryan Shaffer

Ryan Shaffer is in the department of history at the State University of New York at

Purdue Panel Finds Scientific Misconduct in Researcher's Bubble Fusion Reports

A Purdue University panel has found a researcher guilty of two counts of scientific misconduct in a much-disputed case of bubble, or desktop, fusion.

The researcher, Rusi P. Taleyarkhan, gained worldwide publicity—and much scientific criticism—in 2002 when he published a paper in *Science* claiming that he had produced nuclear fusion by making tiny bubbles collapse in a liquid. This is sometimes called sonofusion. (*Science* published a companion piece at the same time from researchers at Oak Ridge National Laboratory saying they could not reproduce the result. Other scientists, including some at Purdue, have likewise been unable to reproduce it.)

Nevertheless, the investigating panel made no judgment about the validity of the reported experimental results. Its only task was to assess specific charges of misconduct. The new report found misconduct in subsequent papers published in 2005. The investigation committee, which included scientists from Purdue, University of California San Diego, Notre Dame, Ohio State, and Argonne National Laboratory, found that Taleyarkhan had engaged in two acts of scientific misconduct in the 2005 papers.

One was his assertion that he had independent confirmation of his findings, which the investigation concluded was not true. Taleyarkhan was himself involved in the supposed confirmatory experiments, so they were not independent. The other was the addition to the paper's list of authors the name of a researcher who had not at that time participated in the research. The panel found that Taleyarkhan knew that the researcher in question had not substantively contributed to the papers. "This is research misconduct," they noted.

The panel also examined a Purdue University news release reporting the research and found that while it was technically true, "it is crafted in a very misleading way." But because it was written for the public and is not a part of the official scientific record, "the manipulation of the press release does not constitute research misconduct."

The panel's report had been given to the Office of Naval Research, which met on July 16 and found that Purdue's investigation was "prompt, thorough, and objective and the institution will adequately resolve the issues." The panel issued its full report on July 18; it can be found on the Web at http://tinyurl.com/5zxky6.

The committee said its investigation had given it a glimpse of human and institutional failings. "From a small beginning there developed a tangled web of wishful thinking, scientific misjudgment, institutional lapses, and human failings. Each strand could have been resolved separately, but knitting them together produced a crisis.

"The broader issues that have emerged bear upon the interactions between science and government, the public communication of science, and ultimately, the integrity of the research process itself."

It added that "absolute honesty and transparency are essential ingredients of science," and without full confidence in the integrity of the information produced, the validity of results can't be judged by peers or society at large.

All relevant aspects of an experiment must be described, and the authors listed must be responsible for the result, the committee emphasized. This is especially important, it said, in a "confirmatory experiment, since *reproducibility* and *independent* experiments and researchers is a key component of the scientific method."

Taleyarkhan is shown here with his experiment. (U.S. Department of Energy file photo/Lynn Freeny)

On August 27, Purdue University announced that an appeals committee had upheld the findings of misconduct against Taleyarkhan and imposed punishment on him. Provost William R. Woodson said Taleyarkhan will remain on the faculty but his distinction as a "named" professor will be removed, along with an annual $25,000 that accompanied it. In addition, he will be prohibited from serving as a thesis advisor to graduate students for at least the next three years.

—Kendrick Frazier

Kendrick Frazier is a science writer and editor

Asteroids Named for Skeptics, Authors, Science Educators

By long-standing tradition, discoverers of asteroids have the distinct privilege of proposing names for them. This year, astronomers Jeff Medkeff and David Healy recently named several asteroids after well-known science educators, authors, and promoters, including:

• Paul Z. Myers (P.Z. Meyers), associate professor of biology at the University of Minnesota-Morris. Asteroid "Paulmyers" was discovered March 29, 2001.

• Philip Plait, author and astronomer. Asteroid "Philplait" was discovered November 23, 2000.

• Michael Stackpole, science-fiction author. Asteroid "Stackpole" was discovered on March 23, 2001.

• Rebecca Watson, radio host and science blogger. Asteroid "Rebeccawatson"

was discovered March 22, 2001.

P.Z. Myers is the author of the most popular science blog in the world—Pharyngula (http://scienceblogs.com/pharyngula/). He was an early adopter of the Internet to promote scientific understanding, having previously participated in the news group Talk.Origins in the 1990s. Myers has written about science for numerous magazines and appeared on television and radio to discuss public issues that intersect with science.

Myers earned his PhD in biology at the University of Oregon, where his education focused on neurobiology. He currently studies evolutionary development using zebra fish as a model and is particularly interested in the development of the nervous system.

"P.Z. Myers sets a great example as a science-communicator and has inspired thousands of people with his visionary approach to the topic. He's injected a lot of enthusiasm into the pro-science,

pro-reality community," says Medkeff.

Philip Plait is internationally recognized for popularizing astronomy in TV and radio appearances, in books, and on his blog. He is the author of *Bad Astronomy: Misconceptions and Misuses Revealed, from Astrology to the Moon Landing "Hoax,"* published in 2002 by Wiley and Sons. His Web site and blog, Bad Astronomy (www.badastronomy.com), are among

the most widely read in the known universe.

Michael Stackpole is a prolific science-fiction author, best known for writing *Battletech* and *Star Wars* novels, and has had eight novels on the *New York Times* Bestseller list. He is also a two-time H.G. Wells award-winning game designer and was inducted into the Academy of Gaming Arts and Design's Hall of Fame in 1993. He has lived in Arizona since 1977.

He is also executive director of the Arizona Skeptics, which annually publishes a list of predictions for the upcoming year that consistently beats the similar annual predictions of so-called psychics for accuracy. He is

well known for his grass-roots efforts to promote rational thinking through appearances on radio and TV.

Rebecca Watson has spent years promoting science, rationalism, and feminism. Watson, who grew up in New Jersey and was a successful magician and street juggler, became interested in the skeptical movement after learning about it from famed magician James "The Amazing" Randi. She later founded the Skepchick Web site (www.skepchick.org), which discusses science, skepticism, and feminism. She is also a personality on the Skeptic's Guide to the Universe podcast, listened to by 40,000 people each week. In 2007 she was selected to host the NPR radio show, Curiosity Aroused.

"Rebecca has provided a much-needed injection of enthusiasm and humor into science education. But just as important is the way she's encouraged so many women to become involved," says Medkeff.

This story was compiled from information submitted by Jeff Medkeff. In December 2007 Medkeff started the Blue Collar Sci-

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Toni Van Pelt, Paul Kurtz, and Ron Lindsay (standing); Lawrence Krauss, David Helfland, and Nobel Laureate Paul Boyer (seated) introduced the Declaration in Defense of Science and Secularism at the inaugural press conference of the Center for Inquiry/Office of Public Policy in Washington, D.C.

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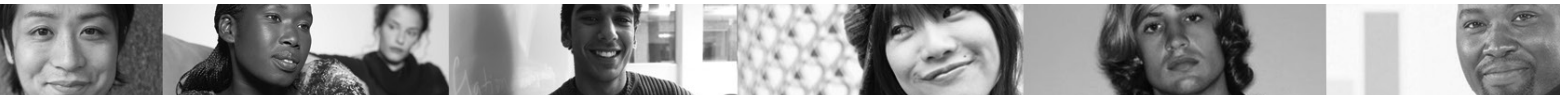


Jon Beckjord, Advocate of a Paranormal Bigfoot (1939–2008)

Jon Erik Beckjord, well known as a paranormal investigator focusing on Bigfoot, died July 22 from prostate cancer near his home in Lafayette, California, near San Francisco. He was sixty-nine. His death was reported in the *San Francisco Chronicle* July 25. A tall, muscular, swaggering man—he stood well over six feet—some folks joked that Beckjord *was* a Bigfoot, although he always denied it.

Beckjord differed from most Bigfoot investigators in maintaining that the creature was "paranormal" and not an actual, physical animal. This, he said, explains how Bigfoot is allegedly able to maintain its selective visibility, like a ghost fleetingly glimpsed in circumstances where its existence ought to be provable beyond any doubt, appearing and disappearing at will. Beckjord would look for evidence of Bigfoot not only in the conventional way—tracks, hair, etc.—but in photographs of forest scenes. Enlarging the leaves enormously, he would look for images of faces hidden among the shadows and the leaves (we published one in SI, Spring 1981, with his commentary, all in response to a highly critical SI report by Paul Kurtz, Fall 1980). Given the human propensity for seeing faces in random patterns, such faces could nearly always be found. Beckjord's former Web site at www.beckjord.com contained many examples of his "paranormal faces in the trees," but unfortunately it is no longer operational. In addition to Bigfoot, Beckjord was an avid investigator of crop circles. He made several trips to Britain to check out the latest crop formations and confer with other crop-circle aficionados. He also traveled to Loch Ness, trying to get photos of its famous "monster."

Born in Minnesota, Beckjord earned a BA from Tulane University and an MBA from the University of California at Berkeley. Afterwards he lived in the Pacific Northwest, where he worked as a cameraman and began his Bigfoot investigations. In 1983 he moved to the Los Angeles area, where he opened a Bigfoot museum in Malibu. The Malibu fires of 1993 destroyed that museum, causing the loss of what Beckjord said were nine plaster casts of Bigfoot prints and the allegedly only known samples of Bigfoot's hair and blood. (Why a paranormal creature should have hair and blood is not entirely clear.) Beckjord

Erik Beckjord, posing to see how he measures up next to a huge mural of Bigfoot. (Photo by Robert Sheaffer)

Firebombings Target University Animal Researchers

Two fire bombings against two biomedical researchers from the University of California, Santa Cruz, on the same weekend in August, were called acts of domestic terrorism and attributed to animal-rights extremists.

The crimes were the latest acts of violence apparently carried out by extremists who oppose any research on animals (see P. Michael Conn and James V. Parker, "Warning: Animal Extremists Are Dangerous to Your Health," SI, May/June 2008).

Developmental neurobiologist David Feldham, his wife, and their two young children fled down a fire escape from a second-story window after the firebombing of their home just before 6 a.m. on August 2. A near-simultaneous firebomb destroyed the car of another UCSC biomedical researcher. Police described the explosives as a "Molotov cocktail on steroids."

Police and the university suspect that both acts are the work of animal-rights extremists. The previous week, pamphlets titled "Murderers and Torturers Alive and Well in Santa Cruz" were discovered in a downtown Santa Cruz coffee shop and given to police. They contained the photographs, home addresses, and phone numbers of thirteen UCSC faculty members along with what Santa Cruz police Captain Steve Clark called "threat-laden language" condemning animal research. Feldham was one of those listed. His work uses mice in studies of how the brain's visual system develops.

The scientist whose car was firebombed lives next door to another researcher named on the list, leading to speculation that the culprits might have missed their intended target.

The firebombing of Feldman's house is being investigated as an attempted homicide, because the family was home at the time. The Federal Bureau of Investigation will investigate the incidents as domestic terrorism.

UCSC Chancellor George Blumenthal condemned the attacks as "criminal acts of anti-science violence." Officials announced a $30,000 reward for information leading to the arrest and prosecution of those responsible.

In February the Society for Neuroscience issued a document calling for the protection of academic researchers who "face intimidation, harassment, and physical attack by fringe anti-animal research extremists."

then moved to the Bay Area, opening a museum of Bigfoot, UFOs, and the Loch Ness Monster in San Francisco in 1996. However, the museum was not financially successful, and it soon closed.

I knew Beckjord for close to thirty years. We first met when I was living in Maryland around 1979 when he stopped by my house to show me a photograph of the head of a dead animal; its identity was difficult to discern because of the way it was turned. He was convinced it was evidence of Bigfoot and was going to meet with someone at the Smithsonian to show it to them. They were not impressed. Over the years, our paths crossed many times due to his frequent Bigfoot-related travel and attendance at UFO conferences, especially after he moved to the Bay Area. His manner was frequently aggressive and brash. He was banned from several online forums for alleged abusive postings, and he was known to occasionally get into fistfights. One oft-noted incident at a UFO conference involved Beckjord tussling with Bill Cooper, a conspiracy-related author, survivalist, and antigovernment militant, who was later killed in a shootout with sheriff's police (SI, March/April 2002; see http://tinyurl.com/5cljmr).

Beckjord led several camping expeditions in the Sierras, into the El Dorado National Forest, where he believed Bigfoot could be seen. The creature, however, was seen mostly *paranormally* through enlarged photos of leaves and shadows. There was one tree behind which Bigfoot could sometimes allegedly be seen in a photo as a shadowy figure. Because Beckjord insisted that there was an excellent chance of seeing something paranormal, I accompanied him in 1999 on a camping trip to this spot. I wrote up the results in detail in this magazine (SI, November/December 1999; see http://tinyurl.com/5a5wly). There was nothing to be seen except for alleged faces hidden in photos of the leaves.

I was frequently exasperated by Beckjord and by his sometimes rude and aggressive manner, as is apparent from my write-up of our Bigfoot search. He was a larger-than-life character, about whom CNN correspondent Rusty Dornin wrote in 1997, "If it's far-fetched and unproved, Beckjord buys it" (see http://www3.cnn.com/US/9704/19/ufo.museum/). But the world of the paranormal is a less colorful and interesting place with his passing.

—Robert Sheaffer

Robert Sheaffer is a Committee for Skeptical Inquiry fellow. His SKEPTICAL INQUIRER *column "Psychic Vibrations" observes its thirtieth anniversary this year. His Web site is www.debunker.com.*

Mickelson, McKellar Tout Science, Math, and Being Smart

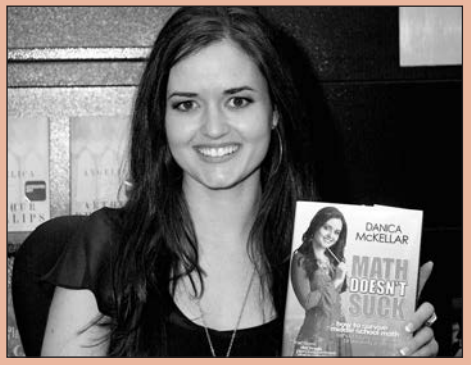
Kudos to two prominent celebrities who are championing science and math education and the virtues of being smart:

Phil Mickelson, the golfer, testified before Congress July 22 that America's schools aren't producing enough math and science graduates to keep up with the world. He and his wife Amy were hosted by Secretary of Education Margaret Spellings. For the past four years, the Micklesons have presented the Mickelson ExxonMobile Teachers Academy, a professional enrichment program for elementary school math and science teachers. This past summer the academy sent more than 600 teachers to learn creative ways to make science and math more interesting to students. Its commercials, shown on television coverage of major golf tournaments, portray dynamic graphics to emphasize scientific principles in golf and encourage students to study science and engineering. As Mickelson recently told some students, "I use science every day in golf. I use it to better my game. It tells me what to practice and how to practice. Those little dimples of a golf ball are like wings on an airplane."

Phil Mickelson acknowledges the crowd as he walks up the 14th fairway during four-ball match play against team Europe on September 20, 2008. (UPI Photo/Mark Cowan Photo via Newscom)

Danica McKellar, the actress (child star of *The Wonder Years* who has also appeared on *The West Wing* and in thirty films, TV movies, and plays), rips the lid off the myth that math "sucks" (to borrow her slang) in her book *Math Doesn't Suck* and shows that math can be easy, relevant, and even glamorous. "Smart is sexy!" says McKellar.

Math Doesn't Suck, published in hardback last year, came out in paperback July 1, and her new book *Kiss My Math* was issued August 5. Of the new book, the Associated Press said, "Danica McKellar has a message for girls: 'Cute and smart is better than cute and dumb.'" Her mathdoesntsuck.com Web site includes a section for girls: "Quiz: Do You Hide Your Smarts?" McKellar is a summa cum laude graduate of UCLA with a degree in mathematics. She has been honored in the *Journal of Physics* for her work in mathematics, notably for her role as co-author of a mathematical physics theorem that bears her name (the Chayes-McKellar-Winn Theorem). She was undoubtedly pleased at the report published this summer in *Science* that girls now do just as well as boys in math.



Danica McKellar from *The Wonder Years* at a bookstore appearance, signing her new book, *Math Doesn't Suck*, at Barnes & Noble at The Grove in Los Angeles. (Picture by: Tonya Wise / London Entertainment / Splash News. Photo via Newscom)

Unproven or Disproven Treatments—Why Would Anyone Want to Use Them?

EDZARD ERNST

A recent report (Channel 4 2008) suggests that the sales of homeopathic remedies in the United Kingdom have increased by 24 percent during the last five years. Other unproven or disproven treatments, such as Bach Flower Remedies, crystal therapy, and spiritual healing, are equally popular. But why would anyone want to use unproven or disproven therapies?

According to numerous survey data, people try "alternative" medicine because of a complex mix of factors, including philosophical congruence, a desire to take control over one's health, desperation, rejection of science, and disappointment with conventional healthcare (Stevinson and Ernst 2006). This may well be the case, but I fear the true reason is much more obvious than that.

Nobody, I would argue, would pay for an ineffective medical treatment—unless, of course, he or she was unaware that it does not work. Nobody buys a car that is beyond repair, far less does anyone knowingly employ bogus therapies. This is only conceivable if one has been misled to believe that the treatments in question actually might work. The vast majority of people using homeopathy, for instance, believe it is effective (MillwardBrown 2008).

This is what makes misleading information about alternative medicine particularly pernicious. Untruth can masquerade as truth with the apparent support of personal experience.

Many experts have pointed out how much misleading information exists in the realm of "alternative medicine" (e.g., Schmidt and Ernst 2004, 15, Table 1), and unsurprisingly, the majority of patients feel ill-informed about this area (Joos et al. 2006, 6; Armitage et al. 2007, 10). Reliable information is scarce, and the little that does exist is not easily accessible. Word of mouth is thus the most common source of information for people tempted to try "alternative" medicine (Robinson et al. 2008, 14). Currently, about forty million Web sites exist on this subject. The vast majority provide information that is factually wrong or dangerously misleading. Print media play an important role in introducing "alternative" medicine to consumers, and more often than not, they are equally misleading (Weeks, Verhoef, and Scott 2007, 14). The House of Lords Select Committee already noted eight years ago that the media have "undue influence" in the realm of "alternative" medicine (Lords Report 2000).

Providers of "alternative" medicine are likely to disagree and would point out that "people are not stupid." True enough, consumers trying alternative therapies tend to be well educated (Stevinson and Ernst 2006) and often perceive these treatments as effective (Lords Report 2000). They certainly are not stupid. However, perception can differ from fact. The impression "it worked for me" is often due to a wide range of factors. For instance, symptoms may have improved independent of any intervention, or another treatment was administered at the same time, or the placebo effect could have done its share, or the therapist was kind and caring. This is what makes misleading information about alternative medicine particularly pernicious. Untruth can masquerade as truth with the apparent support of personal experience.

Many people are easily misled,

Table 1

Common themes of misinformation about "alternative" medicine

1. It is natural and thus safe.
2. It has been used for hundreds of years.
3. It defies scientific scrutiny.
4. It is suppressed by the scientific establishment.
5. Anecdotal evidence is good enough.

Edzard Ernst, MD, PhD, is a professor in the Complementary Medicine unit, Peninsula Medical School, Universities of Exeter and Plymouth. He is co-author, with Simon Singh, of Trick or Treatment? Alternative Medicine on Trial *(Brentam Press, UK, 2008). E-mail: Edzard.Ernst@pms.ac.uk.*

particularly if confused by clever marketing techniques. B.J. Palmer, one of the founding fathers of the chiropractic movement, had a motto that adorned his office: "The world is your cow—but you must do the milking" (Shapiro 2008). In his 1926 book *Selling Yourself* he suggested that "patients should never be told that they are well, only that they are getting better. If a patient asks if chiropractic treatments are to be continued for life, the answer should be: No, only as long as you want to stay healthy" (Shapiro 2008).

Misinformation is always regrettable—in the realm of health care it can cost lives. Action is therefore urgently required. The UK Department of Health (DoH) told the House of Lords inquiry: "We believe that it is very important that consumers have access to adequate and appropriate information" (Lords Report 2000). Yet only months later, the DoH sponsored a "patient guide" that is overtly promotional, uninformative, and misleading about many disproven alternative therapies (2005). Lip service is clearly not good enough. What we need are actions like the recent initiative by the Canadian Competition Bureau. They launched a project that uncovered dozens of Canadian Web sites offering bogus "alternative cancer cures" (Industry Canada 2008). Their deputy commissioner commented: "Swindling people living with cancer is one of the most despicable forms of fraud" (Industry Canada 2008). The swindle, I hasten to add, is by no means confined to cancer. In the final analysis, it also damages the respectable aspects of alternative medicine, of which there are many (Singh and Ernst 2008). If disproven treatment options are allowed to masquerade as effective therapies, potentially valuable interventions will be tarnished by the brush of quackery.

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Is 'Knol' for Knowledge or for Pseudoknowledge?

JAY M. PASACHOFF

The runaway success of Wikipedia, which comes up first in many Google searches for information, has led to much criti-

Jay Pasachoff, a new consulting editor of Skeptical Inquirer, *is Field Memorial Professor of Astronomy at Williams College and, during 2008-2009, visiting associate at the California Institute of Technology. E-mail: Jay.M.Pasachoff@williams.edu.*

and can be edited by anybody (with the exception of a few controversial entries, political and otherwise, that are controlled by Wikipedia central), so one never knows whether the site's information is accurate. Still, a comparison of accuracy between a selection of articles from Wikipedia and *Encyclopaedia Britannica*, widely reported in the popular press, shows no major advantage to either.

Google, a wildly successful commer-

cial company in contrast to Wikipedia's nonprofit status, has set out to provide a different kind of online encyclopedia called "Knol: A unit of knowledge." They describe "A knol [as] an authoritative article about a specific topic." The primary advantage Knol has over Wikipedia is supposedly that articles' authors are disclosed.

I was able to write a knol on "Eclipse" during the beta phase of Knol (that is, while it was available to a limited public but still not considered officially online). As a scientist and educator, I wrote a scientifically valid discussion of solar and lunar eclipses, giving examples and showing a few images. One can find it easily by going to knol.google.com and searching for "eclipse" or for my name.

Contributors to Knol have the option of partaking in Google's Adsense program, with some financial return per click. Contributors to Wikipedia, on the other hand, are always uncompensated.

I was prepared to like Knol because of its supposed authoritative nature. We professors don't usually accept Wikipedia as a source for student papers, given the unknown sources of its material. But Knol had the promise of being written by reputable people, so I hoped it would be an accessible and reliable encyclopedia worthy of citation by students.

To see whether this would be the case, I decided to do a little research after my pregnant daughter expressed some concern about how to balance her pregnancy and her eventual newborn baby with her intense job. I had the idea of going to Knol and searching for "pregnancy," perhaps coupled with "work" or "job" or some such. At the top of the list, an entry entitled "Pregnancy and Childbirth" came up. This seemed promising.

Imagine my dismay, then, when the abstract was "Homeopathy is ideal for women in their childbearing years as it is a gentle yet highly effective system of medicine." The article is written by "Dr. Sohil Momin," and clicking on his name yielded a page that says "The requested biographical knol is currently not published." He does have ten knols published, seven of which are about homeopathy and three others related to whether certain individuals (Dave Chappelle, Akon, and Michael Jackson) are Muslim.

Therefore, given that 70 percent of Momin's articles are pseudoscience, I began to worry whether there is any quality control on Knol. I had written one week earlier to knolhelp@google.com to complain that when I searched for "eclipse" it brought up not only my own scientific article but also one entitled "Solar Eclipse August 1," which sounded interesting since I had just returned from Siberia where I viewed the August 1 total solar eclipse. But I was sorry to discover that this knol was about astrology.

My faith in Knol is, therefore, severely shaken. . . it was strange to find "Things to do in Singapore" and "About Cole Slaw with Recipes" mixed in with mostly medical topics.

My faith in Knol is, therefore, severely shaken. A look at the main sign-on page at knol.google.com today shows fifty-five knols, of which forty-nine are related to medicine in some way. So, at least so far, Knol has not revealed itself to be of general interest—and far from encyclopedic. So far, about 90 percent of the material is medical content—caveat emptor to users about its reliability. My first random check, on ulcerative colitis, turned out to be written by a professor at Harvard Medical School and two colleagues, so that one is OK. My second random check, on prostate cancer, is written by a professor of medicine at the University of California at San Francisco. So maybe Knol will be useful after all. But it was strange to find "Things to do in Singapore" and "About Cole Slaw with Recipes" mixed in with mostly medical topics. An article by another University of California at San Francisco doctor on "Complementary and alternative medicine" was somewhat skeptical in its treatment.

I wrote to knolhelp:

> Here is a query that I hope you will take to the highest level within knols: When trying to update my scientific knol "eclipse," a search on that term also brought up "Solar Eclipse August 1." Perhaps you can imagine my surprise and dismay when clicking on it brought up astrology, a totally ridiculous posting.
>
> I submit that if knols doesn't distinguish between science and pseudoscience, then your system won't be suitably respected.

The response I received, within two days, was:

> Hello Jay,
>
> Thank you for your thoughtful feedback regarding Knol. I am passing your email on to the rest of our team for review. As stated on our Help page, the Knol project is a site that hosts many knols written about various subjects. The authors of the knols can take credit for their writing, provide credentials, and elicit peer reviews and comments. In addition to that, users can provide feedback, comments, and related information. Therefore, the Knol project is designed to work as a platform for sharing information, with multiple cues that help reader evaluate the quality and veracity of information. Our team is working hard to provide authors a useful way to share their expertise online, and your feedback will assist us in improving this beta service.
>
> Sincerely, The Knol Team

At least my "eclipse" knol has received sixty-six online comments as of this writing while the astrology "eclipse" knol had no comments. But both were listed with five stars.

Mr. Belloc Objects

MARTIN GARDNER

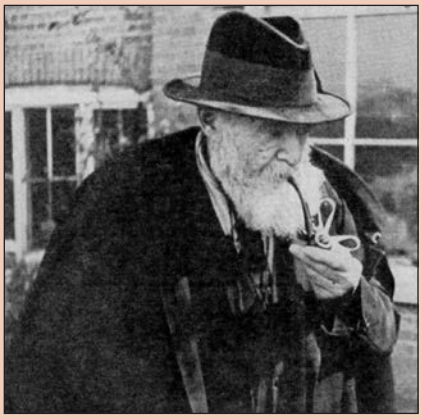
The Battered Silicon Press, a Canadian publishing house, has brought back into print an obscure little book by H.G. Wells. Titled Mr. Belloc Objects*, it is a very funny, slashing attack on Hilaire Belloc's defense of intelligent design in his* Companion to Wells's Outline of History *(1926). What follows is my introduction to Wells's powerful polemic. The book can be obtained postpaid from The Battered Silicon Press, P.O. Box 204, Shelbourne, Ontario, Canada L0N 1S0.*

H. G. Wells's little book, *Mr. Belloc Objects*, is almost totally forgotten today except by Wells collectors. In 1926, when this book was first printed, Wells had hit the jackpot with his *Outline of History*. It had become a worldwide best seller, and had earned for Wells a considerable fortune.

Histories of the world had been written earlier, but Wells's *Outline* differed from them in two ways: Its range was wider, and it opened with a history of prehistoric humanity that assumed the soundness of Darwinian evolution. Hilaire Belloc, a well-known British writer and ultra-conservative Catholic, wrote a series of articles attacking Wells's *Outline*, especially his defense of Darwin. Belloc's articles were widely published in Catholic periodicals, and issued as a book titled *A Companion to Mr. Wells's Outline of History*.

Wells was furious. Not just because evolution was dismissed as bad science, but because Belloc was savage in his personal attacks on Wells. It was the first and last time that Wells was goaded into replying in kind to *ad hominem* criticism. His little book is not only very funny, it is one of the strongest pieces of rhetoric ever written in defense of evolution against a form of creationism known today as intelligent design (ID).

The creationism Belloc defends was not, of course, the crude fundamentalism of Protestant young-earthers convinced that God created the entire universe in six literal 24-hour days. Belloc was not a young earther. He accepted evolution in a sense, but insisted that each species was a new creation. In just what way it was a new creation Belloc does not say. Like today's IDers, Belloc leaves this hopelessly vague. Did God create the first pigs out of cloth? Or did he merely guide mutations in such a way that pigs were suddenly born to non-pig parents?



Hilaire Belloc (1870–1953)

H.G. Wells (1866–1946)

Today's IDers are equally mute on this point. As attorney Phillip Johnson says over and over again in his books defending ID, it is not necessary for opponents of Darwin to explain exactly how God guided evolution. It is only necessary to make clear the inadequacy of explaining the origin of the species by random mutations followed by survival of the fittest.

The question becomes especially bothersome with respect to the origin of humans. As Wells so beautifully argues in his last chapter, proponents of ID are haunted by the many fossils of Neanderthals. Were they true humans, with immortal souls, or were they merely higher apes?

Exactly how did this monumental transition occur? Surely Belloc did not believe God created Adam out of the dust of the earth, then fabricated Eve from one of Adam's ribs. But if the Genesis account is mythological, exactly how was the transition made? Were the first humans reared and suckled by a mother who was a beast? Belloc is as silent on this question as are today's IDers.

At the time Belloc lambasted Wells, the Catholic Church by and large rejected all forms of evolution. Consider the tragic story of St. George Jackson Mivart (1827–1900). He was a much admired British zoologist, author of many books including a massive volume titled *The Cat*, and a student of the great Thomas Huxley. He was also a devout Catholic, but a Catholic with extreme liberal views. Over and over again, in scholarly journals, and in his book *On the Genesis of Species*, Mivart defended the evolution of all forms of life, including humans, but by a process governed by God and with the proviso that immortal souls were infused into the first men and women. Repeatedly he warned his Church that by opposing evolution it was making a

Martin Gardner's latest book is *The Jinn from Hyperspace* (Prometheus, 2007), a collection of essays and reviews. For twenty-five years he wrote the Mathematical Games column in *Scientific American*.

MR. BELLOC OBJECTS
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The Emperor's Postmodern Clothes

A Brief Guide to Deconstructing Academically Fashionable Phrases for the Uninitiated

David A. Levy

PHRASE	TRANSLATION
All points of view are equally valid.	I am willing to abandon all logic and evidence just to maintain the illusion that I am being open-minded and fair.
We need to neutralize the effects of power, status, and privilege.	I wish that I had more power, status, and privilege.
There is no objective reality.	. . . except for what I'm saying right now.
In our culture, empiricism is over-privileged.	I don't have any facts to back up my argument.
Permit me to educate you.	Permit me to invalidate your opinion.
Permit me to deconstruct this sociocultural myth.	Watch me demonstrate how superior I am.
Permit me to share a personal narrative with you.	. . . and I dare you not to display an empathic response.
I am very passionate about these ideas.	The more strongly I feel, the more right I must be.
I'm not saying "better," I'm saying "different."	I'm saying "better."
Let us start a dialogue.	Let me start a monologue.
This warrants more conversation.	I can't believe that you have the temerity not to agree with me.
This warrants *much* more conversation.	I can't believe that you *still* have the temerity not to agree with me.
Don't you think that sounds kind of racist?	Good luck trying to disagree with me *now*.
These are the types of issues we don't talk about enough around here.	You're not feeling guilty enough yet.
Your conclusion is open to contestation.	You are wrong.
One can prove anything with statistics.	I should have paid more attention in stats class.
The interreferential nature of our phenomenological field can be neither deconstructed nor decontextualized from our ontological meta-narrative.	Don't I sound really intellectual and hip?
It's not about race.	It's about race.
It's about race.	It's not about race.
Discussions about cultural diversity are emotionally threatening.	It can't be *my* fault that students don't like my classes.
It is unfortunate that discrimination will always be with us.	. . . which is actually fortunate, because my entire identity would evaporate if I didn't have an enemy to fight against.
Science is merely one more opinion.	My Uncle Bill told me so.

David A. Levy is professor of psychology, Graduate School of Education and Psychology, Pepperdine University, Los Angeles, California.

INVESTIGATIVE

'Hex' Signs: Searching for the Magic

Joe Nickell, PhD, is the author of numerous books, including Entities *and* Adventures in Paranormal Investigation. *His Web site is at www.joenickell.com.*

My introduction to Pennsylvania Dutch "hex" signs came when, as a teenager running my own eastern-Kentucky sign-painting business, I was commissioned to make a pair of the circular emblems. They were for a home that featured Pennsylvania Dutch decor. Far removed as we were from the authentic source of the signs, I copied from a book "traditional" designs that supposedly had magical properties. I was unaware then how nearly everything that has been written about the popular folk creations has been challenged.

Figure 1. An old "hex sign" covered with ivy decorates a Berks County barn. (Photo by Joe Nickell)

Over the years, I have collected examples of the art, together with many books and articles on the topic. In January 2007, my wife and I went on a self-guided driving tour of the Berks County, Pennsylvania, countryside, studying and photographing hex-sign-emblazoned barns (figures 1 and 2), even lunching on Pennsylvania Dutch fare at a homey village inn. I also later sought out information on the signs' reputed cultural antecedents on a trip to Germany the following May. Here is my attempt to bring some clarity to a most controversial subject.

Controversy

Circular designs painted on southeastern Pennsylvania barns have a murky history. One claim is that they were originally "fire signs." That is, they gave notice that the owner's property was covered by an insurance company (Smith 1993, 2). Reportedly, prior to 1800 the Insurance Company of North America used a six-pointed star as its fire mark, and another company, the Sun Fire Office, required insurees to mount on their property its Sun-Mark (Lerch 1949). But this hardly seems a convincing theory of the designs' origin in light of other information.

Another source, in attributing designs to the "Mennonites, or Amish (or Pennsylvania Dutch. . .)" (Lehner 1957, 26–27), confuses matters. While the signs are indeed products of the Pennsylvania "Dutch"—a corruption of *Deutsch* or "German"—such colorful decorations were avoided by the Mennonites (an offshoot of the Anabaptists) and especially by the Amish (members of a Mennonite sect founded by Jacob Ammann in the seventeenth century)—both groups being noted for their "plain" living.[1] Most of the colorful folk arts and crafts were produced by the "fancy" or "church" Dutch—that is, those of the Reformed and Lutheran heritage (Wentz 1993, 21; Mauer 1996, 5). (I interviewed several Amish in New York about this issue and discovered that most knew nothing about hex signs [Nickell 2003].)

It is important to recognize that the Pennsylvania Dutch were not a culturally homogenous group. They were an admixture of Germans and Swiss, together with some German-speaking Alsatians and Lorrainers—their ancestors were mostly German dialect-speaking colonial immigrants. Moreover, they exchanged cultural practices with their Quaker and Scotch-Irish neighbors (Yoder 1971).

Research for my book *Pen, Ink and Evidence*, showed that pictoral elements

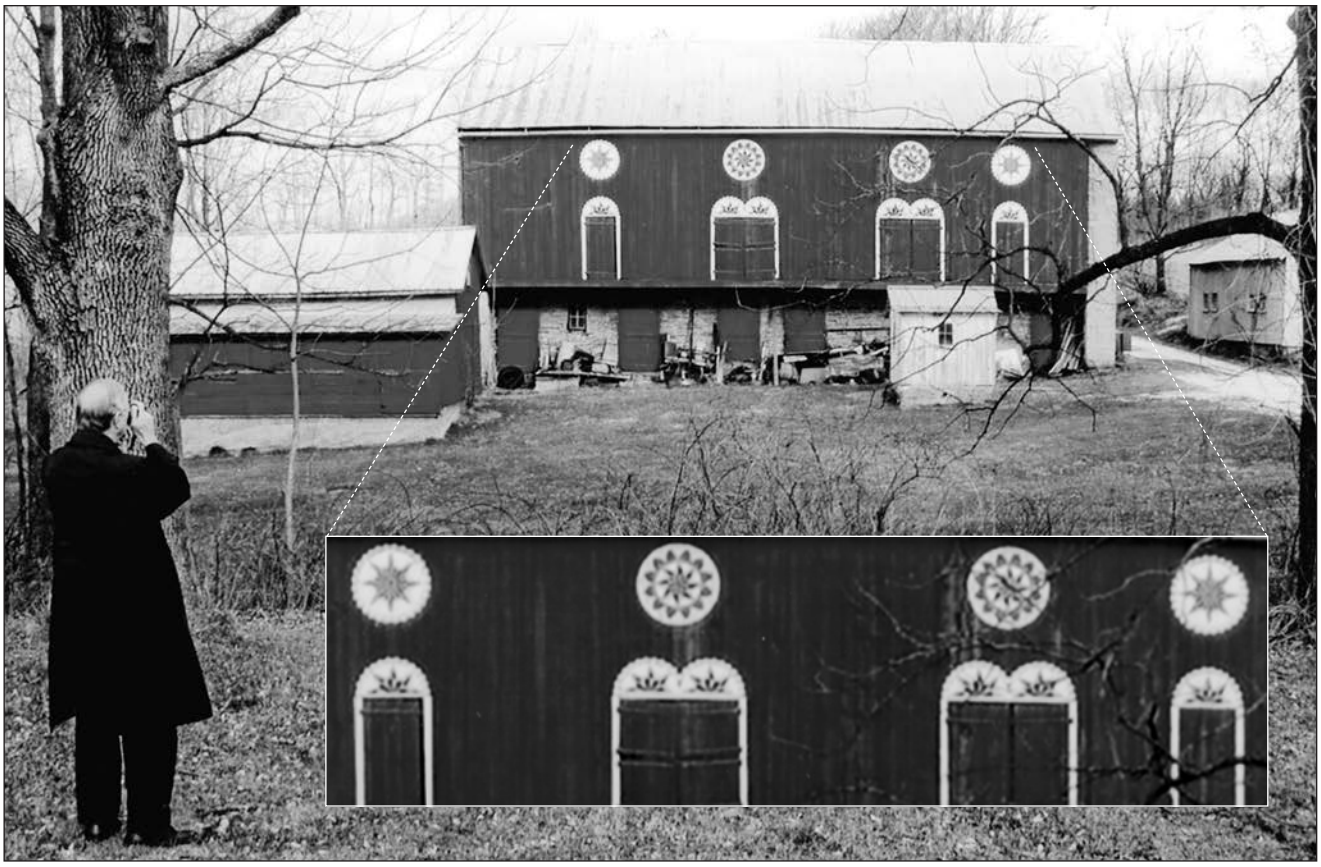

Figure 2. The author photographing a barn emblazoned with "hex signs" in the Berks County, Pennsylvania, countryside. (Photo by Diana Harris)

similar to some that appear as barn signs were found elsewhere in Pennsylvania Dutch creations, including their documents. Called *fracturs* (after the "fractured"-looking, old-German gothic lettering), these were hand-drawn certificates of birth, baptism, and marriage, embellished with colorful designs. They consisted of birds, hearts, flowers, and other motifs, including geometrical forms (Nickell 1990, 126–127, 152; Lichten 1993, 246–249). But was their purpose purely decorative, or did they serve some other function, with hearts invoking love, six-pointed rosettes good luck, and "distelfinks" (goldfinches) happiness, as is often reported (Mauer 1996; *Legendary* 1999, 5–15)?

In Search of "Hex" Signs

The derivation of the name "hex" signs is much disputed. One school of thought holds that the earliest ones were six-sided geometric designs, and thus *hex* was short for *hexagram*, from the Greek *hex-*, meaning "six" ("Hex sign" 2007), or it was an English corruption of the German word for "six," *sechs* ("Hex Signs" 2007). Others argue that the word hex is from the German *Hexe*, "witch," and indicates that the designs were used for magical protection ("Hex sign" 2007).

Scholar Alfred L. Shoemaker (1971, 2) reports finding "the identical geometrical designs as in Pennsylvania in German, Swiss and Alsatian folk art." Shoemaker insists the designs are purely decorative and therefore refers to the "hex" concept as "myth." Folklorist Richard M. Dorson (1972, 274) agrees, labeling the notion a bit of "urban apocrypha." But were the European designs used only as decorations?

I turned my focus to Germany. Although I did not see the designs on barns in Bavaria during my travels there in 2002 and 2007, on the latter trip I did discuss the question of hex signs with folklorist Stephan Bachter. He said that today's Pennsylvania designs appear to him to be decorative folk-art creations. However, it is difficult to know, he cautioned, to what extent people might be genuinely think-ing *magically*—making magic part of their reality—as opposed to simply following some traditional practice. He observed that there were superstitious customs among rural Germans that focused on their barns, including painting pentagrams on the buildings. There were also other such magical practices as placing a broom upside down beside the barn door to keep witches at bay. In addition, certain spells might be written on paper and placed at specific hidden places in a barn, such as under the roof. Bachter even took me with him to the archives at Schloss Darmstadt (Darmstadt Castle)[2] where we were permitted to examine rare German charm books from the eighteenth and nineteenth centuries. These contained various spells and magical designs, including pentagrams (Bachter 2007).

Origin of Barn Signs

The modern concept of Pennsylvania barn designs as "hex" signs can be traced to 1924, when Wallace Nutting, in his book *Pennsylvania Beautiful*, stated: "The ornaments on barns found in Penn-

sylvania . . . go by the local name of hexafoos or witch foot. . . . They are supposed to be a continuance of very ancient tradition, according to which these decorative marks were potent to protect the barn, or more particularly the cattle, from the influence of witches. . . . The hexafoos was added to its decoration as a kind of spiritual or demoniac lightning-rod!" (qtd. in Farrell 1971). Nutting reportedly got his information from one man who convinced him of the antiquity of the practice (Farrell 1971).

However, it seems that Pennsylvania Dutch barns were rarely painted before the 1830s due to the cost of paint (Shoemaker 1971, 4; "Hex sign" 2007). So, distinguished from earlier folk-art motiffs, "hex" signs developed after that time, the earliest one reported in 1850 (having been painted on a barn in Lehigh County, near Chestnut Hill [Smith 1960, 13]). Subsequently, "Barn decoration reached its peak in the early twentieth century, at which time there were many artists who specialized in barn decorating" (Hex sign 2007). One old barn painter, Harry Adams, who painted barns in Berks and nearby counties, stated that he had never been asked to paint special designs for protection or good luck, adding that "I simply make them up as I go along. . . ." Adams acknowledged that while the designs were frequently attributed to witchcraft or other superstitious belief, during all the time he had created them they never had any such actual significance (Smith 1965, 21).

According to Johnnie Brendel, whose grandfather painted "hex signs," the local Pennsylvania Dutch themselves refer to the designs as "barn stars" or "barn flowers." While a particular design might be considered rather vaguely to represent good luck, the real reason it is painted on a barn is to beautify it (Dorson 1972, 275–276).

Most of today's "symbolic" hex signs are copied from traditional folk designs but are usually produced in quantity for the tourist trade or silk screened on discs of pressed wood for later mounting. Referring to these modern artists—some of whom call themselves *hexenmeisters* (i.e., "hexmasters" or "sorcerers" [Gandee 1971; Herr 2002]), one experienced painter remarked, "I doubt if some of those self-styled 'hex' sign painters have ever actually raised a ladder against a barn, let alone paint[ed] one" (qtd. in Smith 1965, 23).

Harry Adams, who painted barns in Berks and nearby counties, stated that he had never been asked to paint special designs for protection or good luck, adding that "I simply make them up as I go along. . . ."

The real hex-signmen are barn painters who first outline the circles on the bare wood planking and fill them in with white paint. Next, using "barn red" paint (originally made with an iron-oxide pigment known as Venetian red [Wendt 1993, 250]), they paint around the circles and then complete the painting of the barn. Finally, they finish the circular decorations by drawing and painting the designs in brilliant colors (Smith 1965, 21–23). For this work, a painter may place extension ladders on both sides of the circle and, using a large iron bracket affixed to each, secure a plank on which to stand or sit (*Pennsylvania* 1971, 3).

Conclusions

The Pennsylvania *Deutsch* have decorated their barns since the 1830s, and hex signs have been painted since 1850. They may have evolved from the practice of painting birds, flowers, and various geometric designs on other folk-art creations, but it appears that any magical or symbolic meaning was effectively lost as the designs became largely or entirely produced as decorations. The modern silk-screened "hex" signs sold to tourists are less a product of folklore than what has rightly been dubbed "fakelore" (Wentz 1994, 12; Dorson 1959, 4).

Notes

1. An exception—a star design on a Mennonite barn in the Shenandoah Valley of Virginia (Smith 1965, 37)—proves the rule.

2. This was at the Technìche Universität Darmstadt where we were generously assisted by Dr. Silvia Uhlemann, manuscripts' librarian.

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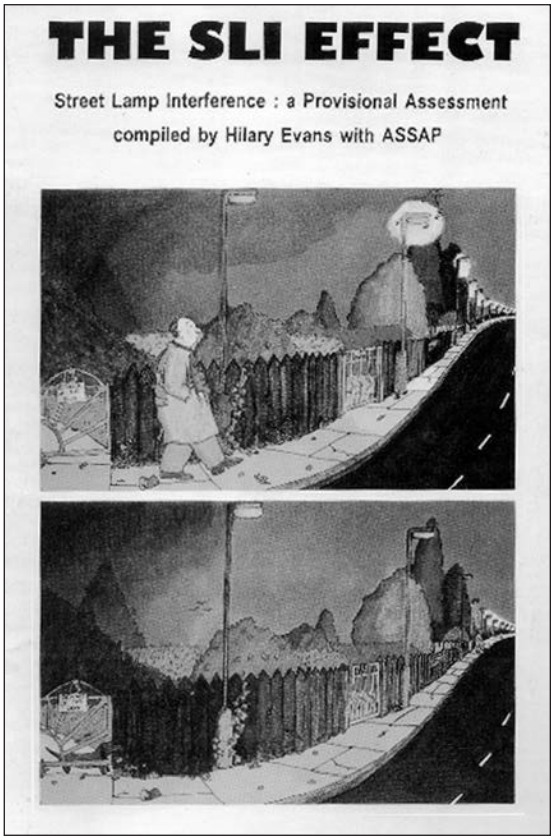
The Curious Case of Street Lamp Interference



It's about midnight and you are heading home. Suddenly, the street lamp above turns off without reason, and you find yourself in the dark. It is natural to experience a chill. But what would you think if street lamps kept turning off when you passed them by?

It is something that many of us have experienced, at least once. Many don't take notice, but others do and wonder if the cause of such interference lies inside them.

"The fact that so many witnesses are making claims which seem to involve a Street Light Interference (SLI for short), that they are doing so in apparent good faith, and doing so independently of one another and without awareness, that the effect may constitute a phenomenon in its own right, these circumstances encourage us to proceed on the basis that SLI, whatever its nature, does indeed occur." These are the words of Hilary Evans, English author, fellow researcher and friend, who in 1993 founded "Project SLIDE".

Says Evans: "Project SLIDE was created simply as a first step towards defining and assessing the apparent phenomenon. As its name implies, it sets out to be little more than an exchange of information between those who are interested."

The idea is that there appears to be an effect that is not consistent with our current knowledge of how people interact with the physical world, and which occurs in specific circumstances.

Four explanations for SLI have been proposed.

Delusion

"A primary question must be: does SLI occur at all, or are the alleged witnesses deluding themselves?" wonders Evans. "Until the phenomenon is scientifically tested, it is not possible to give a decisive answer to this question. However, SLI has not the 'appeal' of witchcraft or abductions: there is nothing like the same psychological pay-off. Individuals seeking to enhance their reputation for possessing special gifts will not find much to flatter themselves with in SLI. In short, it seems highly unlikely that all SLI experiences are delusory."

Energy Fields

Some believe that what is causing street lamps to turn off could be some kind of "energy" emitted by the human body. Eyewitnesses report that the turning off of the lamp happened while they were tired, stressed, furious, or sad. Some others, however, think it might be some kind of static electricity produced by their body.

However, the only form of energy known to science produced by the human body comes via food and breathing and is then used by the body to walk and work. There are no other energies produced or emitted by the human body (except for body warmth, of course). Static electricity is not produced by the human body but by rubbing things, usually synthetic clothes, in a dry climate. It has nothing to do with

Massimo Polidoro is an investigator of the paranormal, author, lecturer, and cofounder and head of CICAP, the Italian skeptics group. His Web site is www.massimopolidoro.com.

one's state of mind. Furthermore, the static electricity produced by a polyester jacket has no way of interacting with street lamps, usually high above street level.

Paranormal Phenomenon

Paranormal phenomenon is the least likely possibility. Science has never confirmed that the human mind can cause physical effects at a distance, which is what seems to be occurring in SLI. "However," says Evans, "SLI does have one great advantage over most psychokinetic experiments: the subjects of the effect—the street lamps—are not easily manipulated." The only problem is that experiments to test SLI are not easy to conduct since this appears to be a phenomenon that just happens at random and is not produced by one willing for it to happen.

Mechanical Effect

"The fact that a mechanical device is involved logically suggests that a mechanical explanation should be looked for," says Evans. But what kind of explanation?

In order to answer this, we need first of all to determine what kind of lamps we are talking about. I asked Mario Bonomo, professor of illuminating engineering at the University of Milano, to illuminate me. "The most common ones, almost all over the world, are sodium vapor lamps. These are gas-discharge lamps that use sodium in an excited state to produce light." There are two varieties of such lamps: low pressure and high pressure. Low pressure are those that produce the characteristic yellow light, while high pressure give a whiter light that allows colors to be recognized. Street lamps usually have low pressure bulbs.

"These bulbs take three to four minutes to light up and have a lifespan of 8,000 hours, two years approximately," continues Bonomo. "When a bulb reaches the end of its life it shows a behavior that could explain SLI. Older lamps need a higher tension than the one they receive. This means that when they are turned on, the tension is sufficient. But when they reach their maximum luminosity, the tension required is more than what is received. This causes the lamp to turn off. Now, in order for it to light up again, the bulb needs to cool off first. And this takes a few minutes. After this, the process, known as cycling, starts again from the beginning until the bulb is substituted with a new one."

Our mind is drawn by significant coincidences, and so we are much more likely to notice when a street light near us turns on or off than when a street light is in a steady state.

This could explain the repeated turning on and off of the lamps. But how can we explain it when it is not just one lamp turning off but all the lamps on a street?

"There are two possible causes," says Bonomo. "The first one is that the bulbs on that specific street are all the same age and, thus, they all get old at the same time, producing clustered but random on and off cycles. However, if street lamps in a specific street turn off all at once, then the problem lies in the central electric-control panel. There usually is one that controls all the lights in a specific block, or one every 200 square meters. A power failure or a short-circuit can cause all the lamps controlled by that panel to turn off."

Finally, if the connection between the lamp and its socket is faulty and gets interrupted for some reason, even for a fraction of a second, the bulb turns off and then it will need a few minutes to turn on again. A contact, especially if already faulty, can be interrupted even by some minor vibration, like a kid kicking the lamp post, a large truck passing in the street, wind rocking the bulb, and so on.

The Power of Suggestion

This is all very interesting and could actually explain much of the SLI phenomenon. However, in order to understand fully what might be taking place here, it is important to consider the observer bias as well. Our mind is drawn by significant coincidences, and so we are much more likely to notice when a street light near us turns on or off than when a street light is in a steady state.

It could just be, then, that SLI is a mix of different natural factors. The normal behavior of bulbs getting older, observer bias, and maybe something else, like the fact that some specific lamps, such as those in gardens or on patios, have infrared sensors that can turn them on or off when something is moving within range. Other lamps are programmed with a timer that turns them on or off at specific hours. Some people realize this is the cause of such changes in the lights.

Evans, however, feels that there is something more in SLI and, thus, he says we should proceed as though the phenomenon exists. "For one very good reason, the fact [is] that a good many people are reporting the experience as though an actual phenomenon is involved. Certainly, people can be mistaken or deluded, and we must keep this possibility in mind. But that, too, is something that would have to be proved before we would accept it; and until such time as it is proved, it is right to respect the testimony of people who claim these experiences at first hand."

The whole thing, however, could become really significant when the same person, at different times and with different lamps, over a consistent period of time, keeps on noticing anomalous behavior of street lamps. So far, however, nobody seems to have had this experience.

Further Reading

You can download for free Hilary Evans's booklet, *The SLI Effect*, Assap Publications, at www.assap.org/newsite/PDF%20pages/Street%20light%20interference.html. □

No More Theory in Science?

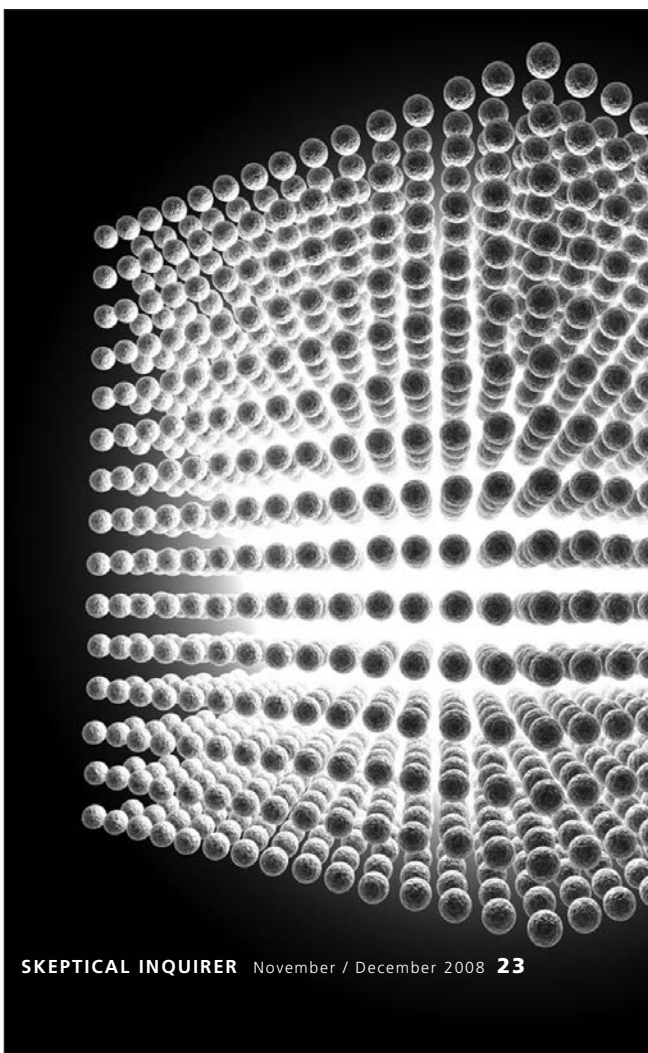
Philosopher Ludwig Wittgenstein famously said, "Whereof one cannot speak, thereof one must be silent." Although Witty meant this in a very specific context, it is good general advice that should have been followed by *Wired* magazine's Chris Anderson. On June 23, 2008, Anderson posted an article titled "The End of Theory: The Data Deluge Makes the Scientific Method Obsolete," from which it is perfectly clear that he doesn't understand a thing about science or the scientific method.

Anderson's main point is that the modern era of "petabyte" information and "cloud" computing on the Web is bypassing the "hypothesize, model, test" procedure of science, because scientific theorizing simply cannot cope with the deluge of data. Here is the master himself: "Out with every theory of human behavior, from linguistics to sociology. Forget taxonomy, ontology, and psychology. Who knows why people do what they do? The point is they do it, and we can track and measure it with unprecedented fidelity . . . the numbers speak for themselves." Actually, the point may or may not be why people do things as opposed to what they do—it depends on one's interest. The numbers, contrary to Anderson's bold assertion, do not, in fact, speak for themselves. As Darwin famously put it: "How odd it is that anyone should not see that all observation must be for or against some view if it is to be of any service!" How odd indeed.

If Anderson was talking about advertising and how companies should select their targets or fine-tune their merchandising, he would be right. But Anderson is clear that this is not what he means: "The big target here isn't advertising, though. It's science. . . . Scientists are trained to recognize that correlation is not causation. . . . There is now a better way. Petabytes allow us to say: 'Correlation is enough.' We can stop looking for models." But if we stop looking for models and hypotheses, is it still science? Science, unlike advertising, isn't about finding patterns (though that is certainly part of the process), it is about finding explanations for those patterns.

In fact, it is easy to argue that Anderson is wrong even about advertising. While *advertisers* may not be interested in theories of human behavior (actually, they are, and they use them to the best of their abilities), by collecting and organizing the data in a particular way (which is what one does when using Google's petabyte-sized cloud) they are formulating hypotheses. Why collect certain pieces of information rather than others? Why use certain keywords to organize the search rather than others? Every choice we make in that respect is reflective of an (often unstated) set of assumptions and hypotheses about what we want and expect from the data. Without models, mathematical or conceptual, data are just noise.

Let's take Anderson's example of what is wrong with science: theoretical physics. He says that "The reason physics has drifted into theoretical speculation about



n-dimensional grand unified models over the past few decades . . . is that we don't know how to run the experiments that would falsify the hypotheses—the energies are too high, the accelerators too expensive, and so on." This is true (see Thinking About Science, SI, May/June 2006), but notice that the problem here is one of insufficient information, what philosophers call the underdetermination of theories by the data, not of too much information, which is Anderson's contention for why science is in trouble.

Anderson goes on to propose a positive example of the new science he envisions: molecular biology done a la Craig Venter (the entrepreneur who pioneered the human genome project). According to Anderson, "Venter has advanced biology more than anyone else of his generation" and has done so, among other things, by conducting a high-throughput search of genomes in the ocean. He simply collected buckets of water, filtered the material, and put the organic stuff through his high-speed genomic sequencing machines. The results are interesting, including the discovery that there are thousands of previously unknown bacterial species. But, as Anderson points out, "Venter can tell you almost nothing about the species he found. He doesn't know what they look like, how they live, or much of anything else about their morphology. He doesn't even have their entire genome. All he has is a statistical blip—a unique sequence that, being unlike any other sequence in the database, must represent a new species." Which means that Venter has succeeded in generating a large amount of data (in response to a specific question, by the way: how many distinct, species-level genome sequences can be found in the oceans?). This will surely provide plenty of food for thought to scientists and a variety of ways to test interesting hypotheses about the structure of the biosphere, the diversity of bacterial life, and so on. But without those hypotheses to test, Venter's data are going to be a useless curiosity, far from being the most important contribution to science in this generation.

The numbers, contrary to Anderson's bold assertion, do not, in fact, speak for themselves. As Darwin famously put it: "How odd it is that anyone should not see that all observation must be for or against some view if it is to be of any service!" How odd indeed.

Anderson boldly closes his piece of epistemic bravado by stating that "The new availability of huge amounts of data . . . offers a whole new way of understanding the world. Correlation supersedes causation, and science can advance even without coherent models, unified theories, or really any mechanistic explanation at all." But science advances only if it can provide explanations, failing which it becomes an activity more akin to stamp collecting. Now, there is an area where petabytes of information can be used for their own sake. But please don't call it science. □

MR. BELLOC OBJECTS
Continued from page 16

foolish mistake similar to the mistake it made in persecuting Galileo for claiming Earth went around the sun. In brief, Mivart held views on evolution identical with the views of almost all of today's Catholic philosophers and theologians. Poor Mivart! He was too far ahead of his time. The Church branded him a heretic, excommunicated him, and denied him a Christian burial.[1]

Today almost all liberal Christians, Protestant or Catholic, regard evolution as God's method of creation, no more requiring miracles along the way than the origin of the solar system required frequent pushes by the Creator, as Newton believed, to keep the planets in orbit.

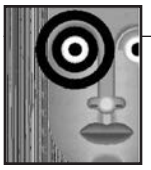
Almost all of today's IDers are conservative Christians. Phillip Johnson is an evangelical Presbyterian. David Berlinski is a conservative Baptist. Michael Behe, the most persuasive of the lot, is a Catholic. Berlinski recently teamed up with Ann Coulter to help her write the part of her book *Godless* in which she bashes Darwin.

How did Belloc react to Wells's attack? He promptly wrote a book titled *Mr. Belloc Still Objects*. I had hoped I could add this to the current piece, but the publisher was unable to locate a copy.

How do things now stand with the Roman Church? I am pleased to report that Pope John Paul II declared evolution to be more than a theory and worthy to be taught in all Catholic schools. The Church is moving slowly and cautiously in a liberal direction—that is, in the direction promoted by such Catholic thinkers as Hans Kung, in Germany, and in the U.S. by Gary Wills, Father Andrew Greeley, and many others. Hopefully it will continue to glide in that direction. If it goes the other way, it will be a sad day for both the Church and the world.

Note

1. On George Mivart, see Chapter nine of my *On the Wild Side* (Prometheus 1992), and Jacob Gruber's excellent biography, *A Conscience in Conflict* (Columbia University Press, 1960).



Secrets of Spectacularly Skewered Skin

Q: What explains the ability of some people to insert sharp spikes into their skin without bleeding or pain?

I'm sure there is nothing paranormal involved, but my friend believes otherwise.

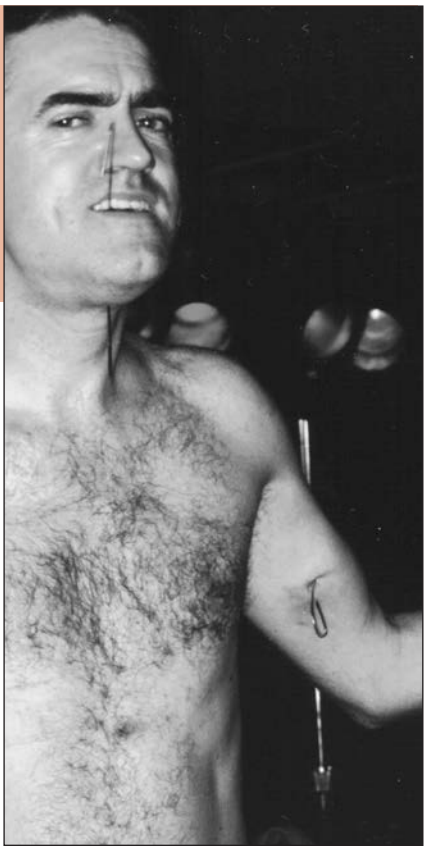
A. Lawson

A: With perhaps the notable exception of masochists, sticking sharp spikes and skewers into your body isn't something most people do for fun. It hurts, it can be dangerous, and it's one of those skills that's best left off your resume.

However, there are a few who do it for a living as part of an act. One of them is Zamora the Torture King, a Las Vegas-based performer who has entertained (and disturbed) audiences for years with his peculiar brand of showmanship.

In his book *Secrets of the Sideshows*, fellow SI columnist and CSI investigator extraordinaire Joe Nickell discusses this as a version of the "human pincushion act" well-known to sideshow performers during the heyday of the carnival (Nickell 2005, 234).

There are several psychological and physiological processes at play. The first is the audience's expectations: when they see a large, sharp, gleaming spike, they tend to overestimate the damage it will do. They may picture what it would do to their own bodies if they stepped on it or jabbed it into their chests. Yet in the right hands, the sharper the skewer is, the less blood there will be, since the performer can then carefully guide it into place with minimal dermal damage.



Zamora the Torture King with skewers through his jaw and arm. (Photo by Benjamin Radford)

Then there's the psychology of the victim/performer. He (it's usually a he) knows when the pain is coming and, through practice, can steel himself against it. In some cases, the skeweree seems better able to control pain than most people: Zamora's tolerance for pain was tested by Dr. Joshua Prager of the UCLA School of Medicine. According to Prager, Zamora's ability to withstand pain was "off the charts," most likely due to meditation and self-hypnosis (*Is It Real?* 2005). Another simple way to ease the discomfort is to take painkillers beforehand—though not aspirin, which would thin the blood and create more bleeding.

The other part is physiological: cleanly made puncture wounds bleed far less than scrapes or cuts, and the skewers are often placed in the fleshy parts of the body, away from major veins and arteries. The inside of the forearms is a popular puncture place, as it has relatively few areas that register pain and even fewer that will bleed profusely. It's not quite accurate to say that there is no blood or pain, but there is certainly less than most people would expect upon seeing a huge metal spike through the arm or jaw.

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Benjamin Radford is managing editor of the SKEPTICAL INQUIRER. *His first book, co-authored with Bob Bartholomew, was* Hoaxes, Myths, and Manias: Why We Need Critical Thinking.

Love at First Sight

Science is exploring the "mystery" of love at first sight. As it turns out, our search for Mr. or Mrs. Right might simply be an exercise, albeit a risky one, in the power of suggestion.

STEPHEN BERTMAN

The song "Some Enchanted Evening" from Rodgers and Hammerstein's *South Pacific* warns us that when it comes to explaining love at first sight, "Fools give you reasons. Wise men never try." Notwithstanding this lyrical warning, more and more psychologists are trying to solve this age-old mystery.

According to a recent survey by marketing expert Earl Naumann (2001), almost two out of three Americans believe in love at first sight. Over half of them claim to have actually experienced it, and over half of those went on to marry the person they had instantly fallen in love with (Naumann 2001). In addition, 75 percent of those couples were still married at the time of Naumann's study, a figure far higher than the national average.

The theory of love at first sight goes all the way back to the days of the ancient Greeks, who worshiped the love goddess Aphrodite (the Romans would later call her Venus). Aphrodite could overwhelm mere mortals with her immense power and take control of their lives by overriding both common sense and conscience. In one legendary case, a handsome Trojan prince named Paris fell in love with a beautiful Spartan queen named Helen, and she with him, the very first time they saw each other. The only problem was that Helen was already married. When the two lovers sailed away together to Troy, Helen's husband assembled an armada to bring his wife back home—later leading the Elizabethan poet Christopher Marlowe to remark that Helen's was "the face that launch'd a thousand ships." A war ensued that lasted ten years, inspiring Homer's two epic poems, *The Iliad* and *The Odyssey*, which would endure forever. As Naumann's scientific survey reveals, "Aphrodite's" influence is alive and well today, still wielding her power over our lives.

Greek myth aside, how can we explain Helen and Paris's attraction to each other? According to legend, Paris was a divinely handsome hero, and Helen was the most beautiful woman in all the world, so perhaps it was their extraordinary looks that drew them together. But in saying that, we'd have to admit simultaneously that not every Dick or Jack is as dashing as Paris, nor every Jane or Jill as stunning as Helen. Though beauty may well be in the eye of the beholder, the fact that ordinary Dicks and Janes fall hopelessly in love the moment they see each other suggests that something other than simple aesthetics is at work. If so, what could that mysterious "something" be?

That Fabulous Face

Since Helen had "the face that launch'd a thousand ships," maybe we should start with the human face in our quest for an answer. After all, when people meet, their faces are usually what they see first. Because of the multiple components that make up the human face, giving it its distinctiveness, our face is the one part of our body that, more than any other, expresses our personal identity. For that reason, the face is the image pressed with affection into so many leather wallets and echoed with passion in the lyrics of so many love songs.

Studies have shown that people who are in love look alike—more so than chance would allow.

But what is there about a face that makes it so hypnotically appealing? One nose, two lips, two eyes—are such physical features sufficient in and of themselves to induce us to surrender our will and cosmically link our life with that of another human being? The answer seems to be yes, according to the findings of investigators.

The first striking fact about the connection between faces and love is that so many people who are in love look alike—more so than chance would allow—a fact documented in recent years by a series of painstaking scientific studies (Griffiths and Kunz 1973; Chambers, Christiansen, and Kunz 1983; and Hinsz 1989). The most recent was conducted by Liliana Alvarez and Klaus Jaffe of Venezuela's Simon Bolivar University (Alvarez and Jaffe 2004). After photographing thirty-six randomly selected couples, Alvarez and Jaffe divided the photographs into six groups. Then, after cutting the pictures from each group in two, shuffling them, and placing them on a table, they invited a panel of neutral judges to match up the correct sexual partners in each group. The experiment was conducted as a double-blind test with neither the judges nor their supervisors knowing the right answers in advance.

According to chance, the judges should have averaged one

Stephen Bertman, PhD, is professor emeritus of Languages, Literatures, and Cultures at Canada's University of Windsor. He is the editor of The Conflict of Generations in Ancient Greece and Rome *and the author of* Hyperculture: The Human Cost of Speed*;* Cultural Amnesia: America's Future and the Crisis of Memory*;* Erotic Love Poems of Greece and Rome*; and most recently,* The Eight Pillars of Greek Wisdom. *E-mail: profbertman2@aol.com.*

correct match for every set of six pictures—about the same as guessing what double number would come up when a pair of dice is rolled. But instead of averaging one right match out of six, the judges got almost two out of six right each time. The close resemblances between sexual partners applied equally to those who were good-looking and to those who were not. In fact, the judges did well even when they were shown only the noses, eyes, or mouths of the test subjects. In short, the study seemed to demonstrate that facial resemblances between romantic partners are significantly higher than mere chance would suggest.

In a separate study by McMaster University psychologist Lisa M. DeBruine, people trusted strangers more when photographs of the strangers' faces were digitally altered by image manipulation software to more closely resemble their own (DeBruine 2002 and 2005). These results supported the findings of a comparable computer-graphics study (Penton-Voak, Perrett, and Pierce 1999) in which individual subjects had preferred members of the opposite sex with face-shapes similar to their own.

Though research has suggested that the faces of older couples grow to look alike because they tend to mimic each other's expressions (Zajonc et al. 1987), other research (Hinsz 1989) has shown that striking facial resemblances are evident among couples who are young as well as old, including those who are engaged and haven't yet married.

Additional support, albeit unscientific, for the theory of "like attracts like" was provided by British portrait painter Suzi Malin in her popular book, *Love at First Sight* (DK, 2004). Intrigued by the facial likenesses between certain celebrity couples (between, for example, Elvis and Priscilla Presley or Brad Pitt and Jennifer Aniston), Malin created a series of "split-screen" portraits by photographically pairing the right half of one lover's face with the left half of the other's. Malin's erotic "Rorschach blots" dramatically convey the astonishing visual correspondences between famous lovers based on the notable similarities between their facial proportions or features. However, as the lives of such celebrity couples sadly demonstrate, facial resemblance may be responsible for mutual attraction in the beginning (through a process unromantically called "physiognomic homogamy"), but in the long run it may not be sufficiently strong to hold a relationship together.

"Darling, we were made for each other."

Why Fido Looks Like Fred

Next door to Malin's portrait gallery hangs a very different set of photographs collected by California-based sociologist Gini Graham Scott: over fifty photos—not of look-alike celebrity couples—but of look-alike dogs and their owners. Scott's pictures appear in her book, *Do You Look Like Your Dog?* (Broadway, 2004), and can be seen on her amusing Web site, www.doyoulooklikeyourdog.com.

Scott's work was inspired by a visit she made to the Golden Gate Dog Show in San Francisco. As she looked at owners sitting on benches beside their competing pets grouped by canine breed, she noticed how remarkably similar the faces of the dogs and their owners appeared. The eventual publication of these and other such matches, in fact, launched Scott on a new and unexpected career. She has since filed an application to trademark the phrase "Do You Look Like . . ." and is on her way to producing another book in a projected series, this one on people and cats.

Around the same time, MasterFoods, Inc., makers of Cesar Select dog dinners, sponsored a nationwide photography contest for look-alike dogs and their owners. The winning entries were exceptional in the degree to which people's facial features and expressions were mirrored in the faces of their pets.

Of course, one swallow (or, in this case, one St. Bernard) does not a summer make. Far from being persuasive evidence that people regularly buy pets that resemble them, the impressive similarities we see in such pictures perhaps are anomalies that in and of themselves don't prove a thing, however funny or fascinating the correlations might appear.

However, two scientific studies have appeared on two different continents that corroborate Scott's observations. In the first study, Michael M. Roy and Nicholas J. S. Christenfeld, professors of psychology at the University of California San Diego, reported the results of an experiment carried out at local dog parks (Roy and Christenfeld 2004; *contra*, Levine 2005; and, in rebuttal, Roy and Christenfeld 2005).

After getting the permission of forty-five dog owners at three different parks, Christenfeld and Roy photographed them along with their animal companions. Pictures of the owners were taken from the waist up in normal clothes. The dogs were photographed from the front also, but at an angle that showed the rest of their body against a different background so the photographic background wouldn't provide a clue as to the matching owner. The investigators then grouped their photos in threes: one picture showing the owner, one showing the owner's dog, and another showing a randomly selected dog that belonged to someone else. The three photo sets were then presented to a panel of twenty-eight naïve undergraduate judges who were asked to match each owner with his or her pet.

When it came to mixed breed dogs, the student judges were unable to make a statistically significant number of correct

matches. But when it came to purebred dogs, the students came up with the right answer 64 percent of the time. As Roy and Christenfeld concluded: "The results suggest that when people pick a pet, they seek one that, at some level, resembles them, and when they get a purebred, they get what they want" because a purebred puppy's final appearance is predictable.

Exactly what led the judges to match so many owners and dogs successfully, however, was difficult to pin down. No one characteristic of people and pets—hairiness, size, sharpness of features, attractiveness, perceived friendliness, or perceived energy level—proved sufficient to explain the correspondences. "It may be," concluded the researchers, "that the judges used some more subtle trait, or based their judgments on a more configural analysis of the animals," i.e., an analysis based on more than one trait in combination.

Roy and Christenfeld's findings were confirmed by a similar research project conducted by Simon Bolivar University researchers Christina Payne and Klaus Jaffe (Payne and Jaffe 2005). While attending the National Canine Exposition in Caracas, Venezuela, Payne and Jaffe took photos of purebred dogs and their owners. To eliminate any potential clues as to which dogs went with which owners, Payne and Jaffe used a special photographic process that retained each face but eliminated any tell-tale background. Additionally, the researchers adjusted the images of pets and owners so all faces would be comparably sized. Having done that, they then picked thirty-six canine faces and thirty-six human faces and arranged the photos into six groups, each group containing six dogs and six owners. Finally, eighty judges were selected (half male, half female, drawn from four different age groups) and were asked to pair up the right dogs with the right owners in each set—a harder task than Roy and Christenfeld's judges faced because of the higher number of possible combinations. As you'll recall, they were simply asked to pick which of two dogs belonged to a single owner, whereas Payne and Jaffe's volunteers were required to choose from six possible candidates. Despite the increased level of difficulty, the judges once again paired up owners and dogs far better that mere chance would allow. As Payne and Jaffe summed it up: "Human pet owners and their dogs resemble each other significantly more than expected from random pair formation and . . . this resemblance can be detected by neutral judges." While mere chance would have resulted in about one right pick out of six, Payne and Jaffe's judges averaged two, three, or even four right picks out of six each time.

A third study by University of British Columbia psychologist Stanley Coren revealed that women with long hair tend to prefer dogs with long, floppy ears, while women with shorter or pulled back hair prefer dogs with smaller upright or "pricked" ears (Coren 1999).

Thanks to these careful experiments with pets, we now know that Scott's perception that dogs and owners tend to look alike is supported by rigorous scientific research. But why *do* people buy dogs that resemble them? And why do human couples tend to resemble each other as well?

In Plato's *Symposium*, the Greek playwright Aristophanes recounted a fascinating legend (Plato). According to the tale,

A study by University of British Columbia psychologist Stanley Coren revealed that women with long hair tend to prefer dogs with long, floppy ears.

when human beings were first created, they were comical roly-poly creatures with two faces, four arms, and four legs. The gods then split them in two. Therefore, claimed the playwright, we spend our lives desperately searching for the matching half that we need to complete ourselves.

Are we then somehow cosmically programmed to seek our "other half," a half that is our mirror image? Are we somehow, despite the dictum that "opposites attract," subconsciously drawn to people who resemble us?

The Face in the Water

The ancient Greeks, who seem to have anticipated so many contemporary problems and questions, provided an answer of sorts in the myth of Narcissus. According to the myth (Ovid), Narcissus was an extraordinarily handsome but self-centered young man who spurned all his lovers. Finally, one of them cursed him by praying that someday Narcissus would himself feel the pain of unrequited love. One day while walking through the woods, Narcissus came upon a pond and gazed into its waters. As he did so, he saw the face of a handsome young man looking up at him. Desiring to embrace the beautiful youth, Narcissus dipped his hands into the water, but as he did, the image broke up. Each time he drew closer to the surface of the water, the object of his love seemed to draw closer to him, but each time he reached into its waters, the image again disappeared. Frustrated in his self-love, a despondent Narcissus continued to sit by the edge of the pond until he finally withered away and died. Even in death, the Roman poet Ovid tells us, Narcissus continued to gaze at his own image in the waters of the river Styx.

The myth of Narcissus is the origin of the term "narcissism" and teaches us about the mesmerizing power of self-love, a power that can—if we are not vigilant—consume and destroy us. To be mindlessly attracted to a replica of the familiar face in our mirror may, in fact, be a prescription for a broken heart.

The Birds and the Bees

In fact, it may not be the face we see in our mirror, our *own* face, that guides us in the choice of a mate. The face that functions as our erotic template may in fact be one we saw long before we ever knew what a mirror was.

In 1873, British naturalist D.A. Spalding observed that newly hatched chickens instinctively follow the first moving object they see (Spalding 1873). In 1910, German zoologist Oskar Heinroth observed similar behavior among baby geese. In fact, when goslings were hatched in an incubator (and were thereby prevented from seeing their actual mothers), they instead became attached to the first human beings they saw and responded to them as though the people were their parents. Heinroth concluded that the first image the goslings saw somehow became stamped or "imprinted" on their impressionable young brains (Heinroth 1910).

Sad to say, the socially ostracized baby swan in Hans Christian Andersen's "The Ugly Duckling" would in reality have become a sexual deviant as an adult, inevitably seeking to mate with a bird that looked like the misguided mother duck that originally hatched him.

This theory of "imprinting" was later elaborated by the Austrian zoologist Konrad Lorenz in a paper presented in 1935 and during decades of subsequent research (Lorenz 1937 and 1988; Todd and Miller 1993). As a result of his close observation of ground-nesting birds like ducks and greylag geese, Lorenz concluded that imprinting occurs quickly, taking place only during a critically brief period of time (usually by the first morning after hatching), and is irreversible. Deprived of the sight or sound of its mother, a little duckling or gosling will "adopt" as its parent the first thing it sees and/or hears: a human being (especially if he or she quacks in response to a hatchling's plaintive peep), or strangely, in the absence of a voice, even a silent, inanimate object like a cardboard box, a red balloon, or a white ball. If young ducks or geese imprint on a human, they will affectionately follow behind in a gaggle wherever their "parent" leads.

Sometimes, imprinting can actually work to a bird's advantage. The most striking instance of this was in 1993 when Canadian artist and inventor Bill Lishman helped forgetful geese migrate 400 miles from Ontario to Virginia by training them to follow his ultralight airplane, and again the next year when he led another flock of avian amnesiacs by air all the way to South Carolina (Lishman 1996). Migration is a learned behavior, and the geese, inured for generations to living a soft life amid grassy city parks and ponds, had never been taught the hard ancestral migration route by their parents. By using imprinting to induce the geese to follow his airplane, Lishman became "Father Goose." His aerial exploits are described in his autobiography and were imaginatively and poignantly reenacted in the 1996 family film *Fly Away Home*, starring Jeff Daniels.

Along with Oskar Heinroth, naturalist Konrad Lorenz became the co-founder of the science of ethology—a new science that studied animal behavior—and went on to receive a Nobel Prize for his work. Though Lorenz's findings have been qualified by the findings of later research, his basic theory of "filial imprinting" (imprinting by offspring) is now well documented and accepted by the scientific community. Investigators have even identified the part of a bird's brain that enables a "parent" to be imprinted on a chick (Horn 1998; McCabe and Nicol 1999). When that part (the intermediate and medial portion of the hyperstriatum ventrale, or IMHV) is surgically removed from both sides of a bird's brain, it can no longer recognize or respond to the stimuli that would normally produce a parental imprint. Moreover, not only does imprinting apply to birds but to mammals as well (including mice, guinea pigs, cows, sheep, horses, zebras, and possibly dogs and monkeys).

In addition to advancing the theory of filial imprinting, Lorenz also proposed a theory of *sexual* imprinting. According to this theory, the image imprinted on the brain of the young animal (originally designed by nature to make it easier for an offspring to identify and find its nurturing parent) also has the effect of defining and determining its mating preferences in the future. Thus, upon becoming sexually mature, the young animal seeks out a mate that closely resembles the parental imprint implanted in its brain.

Under normal circumstances that image would be the image of its natural parent, but under abnormal circumstances (when an alien template exists) the poor creature will search for an inappropriate mate (such as another species of animal, a human being, a wading boot, a balloon, or even a ping-pong ball) to copulate with.

Unfortunately, scientific experiments of imprinting like those of Konrad Lorenz have real-life consequences for the creatures that are experimented upon. Sad to say, the socially ostracized baby swan in Hans Christian Andersen's "The Ugly Duckling" would in reality have become a sexual deviant as an adult, inevitably seeking to mate with a bird that looked like the misguided mother duck that originally hatched him. Today's "assembly-line" egg-hatcheries are turning out parentless and potentially pathological chicks, since the only loving hen they ever see is a warm light-bulb.

A Lasting Impression

What, you may justifiably ask, does all this have to do with my love life? If I fall in love at first sight, will I be acting like a "bird-brain"? Well, perhaps. Both birds and human beings are, after all, links in evolution's chain, though there is a huge biological gap between them.

Recent research, however, suggests that imprinting does indeed influence our choice of mates. People choose partners

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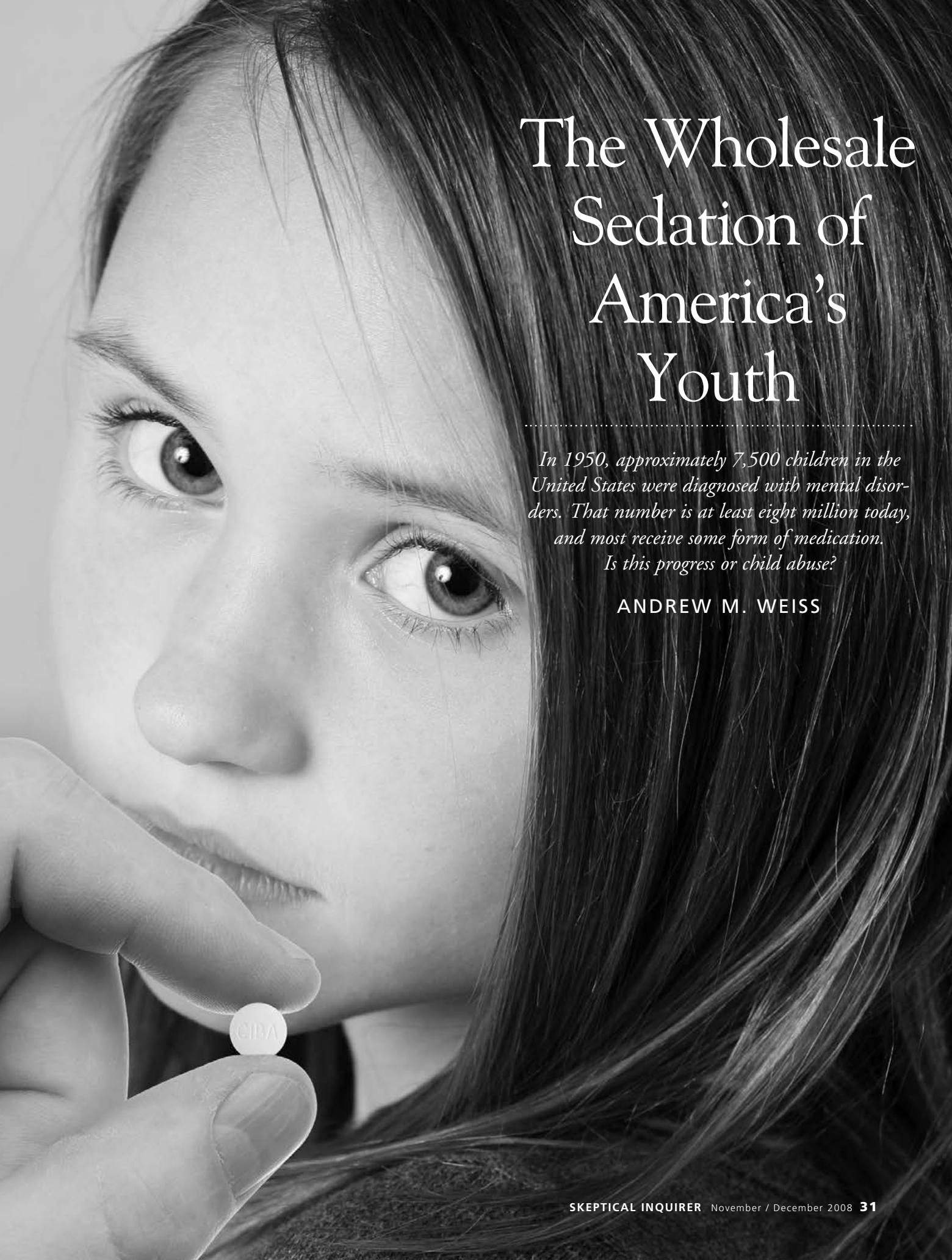

The Wholesale Sedation of America's Youth

In 1950, approximately 7,500 children in the United States were diagnosed with mental disorders. That number is at least eight million today, and most receive some form of medication. Is this progress or child abuse?

ANDREW M. WEISS

In the winter of 2000, the *Journal of the American Medical Association* published the results of a study indicating that 200,000 two- to four-year-olds had been prescribed Ritalin for an "attention disorder" from 1991 to 1995. Judging by the response, the image of hundreds of thousands of mothers grinding up stimulants to put into the sippy cups of their preschoolers was apparently not a pretty one. Most national magazines and newspapers covered the story; some even expressed dismay or outrage at this exacerbation of what already seemed like a juggernaut of hyper-medicalizing childhood. The public reaction, however, was tame; the medical community, after a moment's pause, continued unfazed. Today, the total toddler count is well past one million, and influential psychiatrists have insisted that mental health prescriptions are appropriate for children as young as twelve months. For the pharmaceutical companies, this is progress.

In 1995, 2,357,833 children were diagnosed with ADHD (Woodwell 1997)—twice the number diagnosed in 1990. By 1999, 3.4 percent of all American children had received a stimulant prescription for an attention disorder. Today, that number is closer to ten percent. Stimulants aren't the only drugs being given out like candy to our children. A variety of other psychotropics like antidepressants, antipsychotics, and sedatives are finding their way into babies' medicine cabinets in large numbers. In fact, the worldwide market for these drugs is growing at a rate of ten percent a year, $20.7 billion in sales of antipsychotics alone (for 2007, IMSHealth 2008).

While the sheer volume of psychotropics being prescribed for children might, in and of itself, produce alarm, there has not been a substantial backlash against drug use in large part because of the widespread perception that "medically authorized" drugs must be safe. Yet, there is considerable evidence that psychoactive drugs do not take second place to other controlled pharmaceuticals in carrying grave and substantial risks. All classes of psychoactive drugs are associated with patient deaths, and each produces serious side effects, some of which are life-threatening.

Andrew Weiss holds a PhD in school-clinical psychology from Hofstra University. He served on the faculty of Iona College and has been a senior school administrator in Chappaqua, New York. He has published a number of articles on technology in education. E-mail: anweiss@optonline.net.

In 2005, researchers analyzed data from 250,000 patients in the Netherlands and concluded that "we can be reasonably sure that *antipsychotics* are associated in something like a threefold increase in sudden cardiac death, and perhaps that older antipsychotics may be worse" (Straus et al. 2004). In 2007, the FDA chose to beef up its black box warning (reserved for substances that represent the most serious danger to the public) against *antidepressants* concluding, "the trend across age groups toward an association between antidepressants and suicidality . . . was convincing, particularly when superimposed on earlier analyses of data on adolescents from randomized, controlled trials" (Friedman and Leon 2007). Antidepressants have been banned for use with children in the UK since 2003. According to a confidential FDA report, prolonged administration of *amphetamines* (the standard treatment for ADD and ADHD) "may lead to drug dependence and must be avoided." They further reported that "misuse of amphetamine may cause sudden death and serious cardiovascular adverse events" (Food and Drug Administration 2005). The risk of fatal toxicity from lithium carbonate, a not uncommon treatment for bipolar disorder, has been well documented since the 1950s. Incidents of fatal seizures from sedative-hypnotics, especially when mixed with alcohol, have been recorded since the 1920s.

Psychotropics carry nonfatal risks as well. Physical dependence and severe withdrawal symptoms are associated with virtually all psychoactive drugs. Psychological addiction is axiomatic. Concomitant side effects range from unpleasant to devastating, including: insulin resistance, narcolepsy, tardive dyskenisia (a movement disorder affecting 15–20 percent of antipsychotic patients where there are uncontrolled facial movements and sometimes jerking or twisting movements of other body parts), agranulocytosis (a reduction in white blood cells, which is life threatening), accelerated appetite, vomiting, allergic reactions, uncontrolled blinking, slurred speech, diabetes, balance irregularities, irregular heartbeat, chest pain, sleep disorders, fever, and severe headaches. The attempt to control these side effects has resulted in many children taking as many as eight additional drugs every day, but in many cases, this has only compounded the problem. Each "helper" drug produces unwanted side effects of its own.

The child drug market has also spawned a vigorous black market in high schools and colleges, particularly for stimulants. Students have learned to fake the symptoms of ADD in order to obtain amphetamine prescriptions that are subsequently sold to fellow students. Such "shopping" for prescription drugs has even spawned a new verb. The practice is commonly called "pharming." A 2005 report from the Partnership for a Drug Free America, based on a survey of more than 7,300 teenagers, found one in ten teenagers, or 2.3 million young people, had tried prescription stimulants without a doctor's order, and 29 percent of those surveyed said they had close friends who have abused prescription stimulants.

In a larger sense, the whole undertaking has had the disturbing effect of making drug use an accepted part of childhood.

Few cultures anywhere on earth and anytime in the past have been so willing to provide stimulants and sedative-hypnotics to their offspring, especially at such tender ages. An entire generation of young people has been brought up to believe that drug-seeking behavior is both rational and respectable and that most psychological problems have a pharmacological solution. With the ubiquity of psychotropics, children now have the means, opportunity, example, and encouragement to develop a lifelong habit of self-medicating.

Common population estimates include at least eight million children, ages two to eighteen, receiving prescriptions for ADD, ADHD, bipolar disorder, autism, simple depression, schizophrenia, and the dozens of other disorders now included in psychiatric classification manuals. Yet sixty years ago, it was virtually impossible for a child to be considered mentally ill. The first diagnostic manual published by American psychiatrists in 1952, DSM-I, included among its 106 diagnoses only one for a child: Adjustment Reaction of Childhood/Adolescence. The other 105 diagnoses were specifically for adults. The number of children actually diagnosed with a mental disorder in the early 1950s would hardly move today's needle. There were, at most, 7,500 children in various settings who were believed to be mentally ill at that time, and most of these had explicit neurological symptoms.

Of course, if there really are one thousand times as many kids with authentic mental disorders now as there were fifty years ago, then the explosion in drug prescriptions in the years since only indicates an appropriate medical response to a newly recognized pandemic, but there are other possible explanations for this meteoric rise. The last fifty years has seen significant social changes, many with a profound effect on children. Burgeoning birth rates, the decline of the extended family, widespread divorce, changing sexual and social mores, households with two working parents—it is fair to say that the whole fabric of life took on new dimensions in the last half century. The legal drug culture, too, became an omnipresent adjunct to daily existence. Stimulants, analgesics, sedatives, decongestants, penicillins, statins, diuretics, antibiotics, and a host of others soon found their way into every bathroom cabinet, while children became frequent visitors to the family physician for drugs and vaccines that we now believe are vital to our health and happiness. There is also the looming motive of money. The *New York Times* reported in 2005 that physicians who had received substantial payments from pharmaceutical companies were five times more likely to prescribe a drug regimen to a child than those who had refused such payments.

So other factors may well have contributed to the upsurge in psychiatric diagnoses over the past fifty years. But even if the increase reflects an authentic epidemic of mental health problems in our children, it is not certain that medication has ever been the right way to handle it. The medical "disease" model is one approach to understanding these behaviors, but there are others, including a hastily discarded psychodynamic model that had a good record of effective symptom relief. Alternative, less invasive treatments, too, like nutritional treatments, early intervention, and teacher and parent training programs were found to be at least as effective as medication in long-term reduction of a variety of symptoms (of ADHD, The MTA Cooperative Group 1999).

Nevertheless, the medical-pharmaceutical alliance has largely shrugged off other approaches and scoffed at the potential for conflicts of interest and continues to medicate children in ever-increasing numbers. With the proportion of diagnosed kids growing every month, it may be time to take another look at the practice and soberly reflect on whether we want to continue down this path. In that spirit, it is not unreasonable to ask whether this exponential expansion in medicating children has another explanation altogether. What if children are the same as they always were? After all, virtually every symptom now thought of as diagnostic was once an aspect of temperament or character. We may not have liked it when a child was sluggish, hyperactive, moody, fragile, or pestering, but we didn't ask his parents to medicate him with powerful chemicals either. What if there is no such thing as mental illness in children (except the small, chronic, often neurological minority we once recog-

Common population estimates include at least eight million children, ages two to eighteen, receiving prescriptions for ADD, ADHD, bipolar disorder, autism, simple depression, schizophrenia, and the dozens of other disorders now included in psychiatric classification manuals. Yet sixty years ago, it was virtually impossible for a child to be considered mentally ill.

nized)? What if it is only our perception of childhood that has changed? To answer this, we must look at our history and at our nature.

The human inclination to use psychoactive substances predates civilization. Alcohol has been found in late Stone Age jugs; beer may have been fermented before the invention of bread. Nicotine metabolites have been found in ancient human remains and in pipes in the Near East and Africa. Knowledge of *Hul Gil*, the "joy plant," was passed from the Sumerians, in the fifth millennium B.C.E., to the Assyrians, then in serial order to the Babylonians, Egyptians, Greeks, Persians, Indians, then to the Portuguese who would introduce it to the Chinese, who grew it and traded it back to the Europeans. *Hul Gil* was the Sumerian name for the opium poppy. Before the Middle Ages, economies were established around opium, and wars were fought to protect avenues of supply.

With the modern science of chemistry in the nineteenth century, new synthetic substances were developed that shared many of the same desirable qualities as the more traditional sedatives and stimulants. The first modern drugs were barbiturates—a class of 2,500 sedative/hypnotics that were first synthesized in 1864. Barbiturates became very popular in the U.S. for depression and insomnia, especially after the temperance movement resulted in draconian anti-drug legislation (most notoriously Prohibition) just after World War I. But variety was limited and fears of death by convulsion and the Winthrop drug-scare kept barbiturates from more general distribution.

Stimulants, typically caffeine and nicotine, were already ubiquitous in the first half of the twentieth century, but more potent varieties would have to wait until amphetamines came into widespread use in the 1930s. Amphetamines were not widely known until the 1920s and 1930s when they were first used to treat asthma, hay fever, and the common cold. In 1932, the Benzedrine Inhaler was introduced to the market and was a huge over-the-counter success. With the introduction of Dexedrine in the form of small, cheap pills, amphetamines were prescribed for depression, Parkinson's disease, epilepsy, motion sickness, night-blindness, obesity, narcolepsy, impotence, apathy, and, of course, hyperactivity in children.

Amphetamines came into still wider use during World War II, when they were given out freely to GIs for fatigue. When the GIs returned home, they brought their appetite for stimulants to their family physicians. By 1962, Americans were ingesting the equivalent of forty-three ten-milligram doses of amphetamine per person annually (according to FDA manufacturer surveys).

Still, in the 1950s, the family physician's involvement in furnishing psychoactive medications for the treatment of primarily psychological complaints was largely sub rosa. It became far more widespread and notorious in the 1960s. There were two reasons for this. First, a new, safer class of sedative hypnotics, the benzodiazepines, including Librium and Valium, were an instant sensation, especially among housewives who called them "mothers' helpers." Second, amphetamines had finally been approved for use with children (their use up to that point had been "off-label," meaning that they were prescribed despite the lack of FDA authorization).

Pharmaceutical companies, coincidentally, became more aggressive in marketing their products with the tremendous success of amphetamines. Valium was marketed directly to physicians and indirectly through a public relations campaign that implied that benzodiazepines offered sedative/hypnotic benefits without the risk of addiction or death from drug interactions or suicide. Within fifteen years of its introduction, 2.3 billion Valium pills were being sold annually in the U.S. (Sample 2005).

So, family physicians became society's instruments: the suppliers of choice for legal mood-altering drugs. But medical practitioners required scientific authority to protect their reputations, and the public required a justification for its drug-seeking behavior. The pharmaceutical companies were quick to offer a pseudoscientific conjecture that satisfied both. They argued that neurochemical transmitters, only recently identified, were in fact the long sought after mediators of mood and activity. Psychological complaints, consequently, were a function of an imbalance of these neural chemicals that could be corrected with stimulants and sedatives (and later antidepressants and antipsychotics). While the assertion was pure fantasy without a shred of evidence, so little was known about the brain's true actions that the artifice was tamely accepted. This would later prove devastating when children became the targets of pharmaceutical expansion.

With Ritalin's FDA approval for the treatment of hyperactivity in children, the same marketing techniques that had been so successful with other drugs were applied to the new amphetamine. Pharmaceutical companies had a vested interest in the increase in sales; they spared no expense in convincing physicians to prescribe them. Cash payments, stock options, paid junkets, no-work consultancies, and other inducements encouraged physicians to relax their natural caution about medicating children. Parents also were targeted. For example, CIBA, the maker of Ritalin, made large direct payments to parents' support groups like CHADD (Children and Adults with Attention Deficit/Hyperactivity Disorder) (The Merrow Report 1995). To increase the acceptance of stimulants, drug companies paid researchers to publish favorable articles on the effectiveness of stimulant treatments. They also endowed chairs and paid for the establishment of clinics in influential medical schools, particularly ones associated with universities of international reputation. By the mid 1970s, more than half a million children had already been medicated primarily for hyperactivity.

The brand of psychiatry that became increasingly popular in the 1980s and 1990s did not have its roots in notions of normal behavior or personality theory; it grew out of the concrete, atheoretical treatment style used in clinics and institutions for the profoundly disturbed. German psychiatrist Emil Kraepelin, not Freud, was the God of mental hospitals, and pharmaceuticals were the panacea. So the whole underlying notion of psychiatric treatment, diagnosis, and disease changed. Psychiatry, which had straddled psychology and medicine for a hundred years, abruptly abandoned psychology for a comfortable sinecure within its traditional parent discipline. The change was

profound.

People seeking treatment were no longer clients, they were patients. Their complaints were no longer suggestive of a complex mental organization, they were symptoms of a disease. Patients were not active participants in a collaborative treatment, they were passive recipients of symptom-reducing substances. Mental disturbances were no longer caused by unique combinations of personality, character, disposition, and upbringing, they were attributed to pre-birth anomalies that caused vague chemical imbalances. Cures were no longer anticipated or sought; mental disorders were inherited illnesses, like birth defects, that could not be cured except by some future magic, genetic bullet. All that could be done was to treat symptoms chemically, and this was being done with astonishing ease and regularity.

In many ways, children are the ideal patients for drugs. By nature, they are often passive and compliant when told by a parent to take a pill. Children are also generally optimistic and less likely to balk at treatment than adults. Even if they are inclined to complain, the parent is a ready intermediary between the physician and the patient. Parents are willing to participate in the enforcement of treatments once they have justified them in their own minds and, unlike adults, many kids do not have the luxury of discontinuing an unpleasant medication. Children are additionally not aware of how they ought to feel. They adjust to the drugs' effects as if they are natural and are more tolerant of side effects than adults. Pharmaceutical companies recognized these assets and soon were targeting new drugs specifically at children.

But third-party insurance providers balked at the surge in costs for treatment of previously unknown, psychological syndromes, especially since unwanted drug effects were making some cases complicated and expensive. Medicine's growing prosperity as the purveyor of treatments for mental disorders was threatened, and the industry's response was predictable. Psychiatry found that it could meet insurance company requirements by simplifying diagnoses, reducing identification to the mere appearance of certain symptoms. By 1980, they had published all new standards.

Lost in the process was the fact that the redefined diagnoses (and a host of new additions) failed to meet minimal standards of *falsifiability* and *differentiability*. This meant that the diagnoses could never be disproved and that they could not be indisputably distinguished from one another. The new disorders were also defined as lists of symptoms from which a physician could check off a certain number of hits like a Chinese menu, which led to *reification,* an egregious scientific impropriety. Insurers, however, with their exceptions undermined and under pressure from parents and physicians, eventually withdrew their objections. From that moment on, the treatment of children with powerful psychotropic medications grew unchecked.

As new psychotropics became available, their uses were quickly extended to children despite, in many cases, indications that the drugs were intended for use with adults only. New antipsychotics, the *atypicals*, were synthesized and marketed beginning in the 1970s. Subsequently, a new class of antidepressants like Prozac and Zoloft was introduced. These drugs were added to the catalogue of childhood drug treatments with an astonishing casualness even as stimulant treatment for hyperactivity continued to burgeon.

In 1980, hyperactivity, which had been imprudently named "minimal brain dysfunction" in the 1960s, was renamed *Attention Deficit Disorder* in order to be more politic, but there was an unintended consequence of the move. Parents and teachers, familiar with the name but not always with the symptoms, frequently misidentified children who were shy, slow, or sad (introverted rather than inattentive) as suffering from ADD. Rather than correct the mistake, though, some enterprising physicians responded by prescribing the same drug for the opposite symptoms. This was justified on the grounds that stimulants, which were being offered because they slowed down hyperactive children, might very well have the predicted effect of speeding up under-active kids. In this way, a whole new population of children became eligible for medication. Later, the authors of DSM-III memorialized this practice by renaming ADD again, this time as ADHD, and redefining ADD as inattention. Psychiatry had reached a new level: they were now willing to invent an illness to justify a treatment. It would not be the last time this was done.

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In the last twenty years, a new, more disturbing trend has become popular: the re-branding of legacy forms of mental disturbance as broad categories of childhood illness. Manic depressive illness and infantile autism, two previously rare disorders, were redefined through this process as "spectrum" illnesses with loosened criteria and symptom lists that cover a wide range of previously normal behavior. With this slim justification in place, more than a million children have been treated with psychotropics for bipolar disorder and another 200,000 for autism. A recent article in this magazine "The Bipolar Bamboozle" (Flora and Bobby 2008) illuminates how and why an illness that once occurred twice in every 100,000 Americans, has been recast as an epidemic affecting millions.

To overwhelmed parents, drugs solve a whole host of ancillary problems. The relatively low cost (at least in out-of-pocket dollars) and the small commitment of time for drug treatments make them attractive to parents who are already stretched thin by work and home life. Those whose confidence is shaken by indications that their children are "out of control" or "unruly" or "disturbed" are soothed by the seeming inevitability of an inherited disease that is shared by so many others. Rather than blaming themselves for being poor home managers, guardians with insufficient skills, or neglectful caretakers, parents can find comfort in the thought that their child, through no fault of theirs, has succumbed to a modern and widely accepted scourge. A psychiatric diagnosis also works well as an authoritative response to demands made by teachers and school administrators to address their child's "problems."

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Once a medical illness has been identified, all unwanted behavior becomes fruit of the same tree. Even the children themselves are often at first relieved that their asocial or antisocial impulses reflect an underlying disease and not some flaw in their characters or personalities.

Conclusions

In the last analysis, childhood has been thoroughly and effectively redefined. Character and temperament have been largely removed from the vocabulary of human personality. Virtually every single undesirable impulse of children has taken on pathological proportions and diagnostic significance. Yet, if the psychiatric community is wrong in their theories and hypotheses, then a generation of parents has been deluded while millions of children have been sentenced to a lifetime of ingesting powerful and dangerous drugs.

Considering the enormous benefits reaped by the medical community, it is no surprise that critics have argued that the whole enterprise is a cynical, reckless artifice crafted to unfairly enrich them. Even though this is undoubtedly not true, physicians and pharmaceutical companies must answer for the rush to medicate our most vulnerable citizens based on little evidence, a weak theoretical model, and an antiquated and repudiated philosophy. For its part, the scientific community must answer for its timidity in challenging treatments made in the absence of clinical observation and justified by research of insufficient rigor performed by professionals and institutions whose objectivity is clearly in question, because their own interests are materially entwined in their findings.

It should hardly be necessary to remind physicians that even if their diagnoses are real, they are still admonished by Galen's dictum *Primum non nocere,* or "first, do no harm." If with no other population, this ought to be our standard when dealing with children. Yet we have chosen the most invasive, destructive, and potentially lethal treatment imaginable while rejecting other options that show great promise of being at least as effective and far safer. But these other methods are more expensive, more complicated, and more time-consuming, and thus far, we have not proved willing to bear the cost. Instead, we have jumped at a discounted treatment, a soft-drink-machine cure: easy, cheap, fast, and putatively scientific. Sadly, the difference in price is now being paid by eight million children.

Mental illness is a fact of life, and it is naïve to imagine that there are not seriously disturbed children in every neighborhood and school. What is more, in the straitened economy of child rearing and education, medication may be the most efficient and cost effective treatment for some of these children. Nevertheless, to medicate not just the neediest, most complicated cases but one child in every ten, despite the availability of less destructive treatments and regardless of doubtful science, is a tragedy of epic proportions.

What we all have to fear, at long last, is not having been wrong but having done wrong. That will be judged in a court of a different sort. Instead of humility, we continue to feed drugs to our children with blithe indifference. Even when a child's mind is truly disturbed (and our standards need to be revised drastically on this score), a treatment model that intends to chemically palliate and manage ought to be our last resort, not our first option. How many more children need to be sacrificed for us to see the harm in expediency, greed, and plain ignorance?

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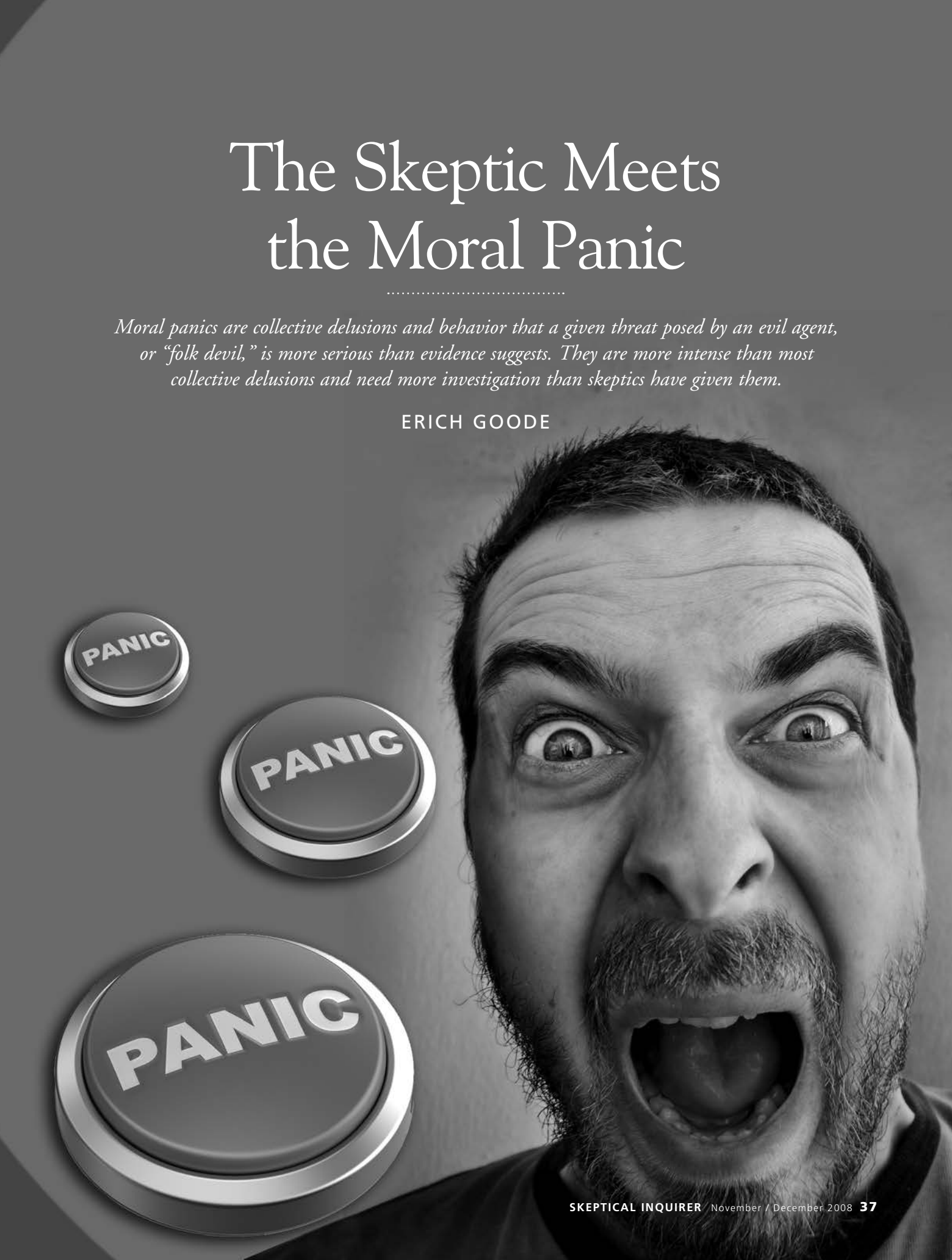
The Skeptic Meets the Moral Panic

Moral panics are collective delusions and behavior that a given threat posed by an evil agent, or "folk devil," is more serious than evidence suggests. They are more intense than most collective delusions and need more investigation than skeptics have given them.

ERICH GOODE



A drug spreads across a continent and up the socioeconomic ladder, leaving devastation and wreckage in its wake. Terrorists devise and attempt to carry out fiendish plots to hijack planes, blow up buildings, and murder innocent citizens to avenge insults suffered by a presumably aggrieved people. An Islamic jihadist videotapes himself beheading an "infidel," shouting slogans about a holy war against the West. Small, gray, extraterrestrial creatures land their aircraft in remote locations, abduct earthlings, and extract sperm from men and eggs and embryos from women. Day care providers from New York to California and from Europe to Australia torture, sexually abuse, and murder children in unspeakable satanic rituals. Men rape and murder women to make pornographic movies.

What's going on here? Who's saying these things? Have these extravagant atrocities actually taken place? And, true or false, what do these concerns, fears, and hostilities express about the societies in which such claims about them are lodged?

A *moral panic* is a scare about a threat or supposed threat from deviants or "folk devils," a category of people who, presumably, engage in evil practices and are responsible for menacing the society's culture, way of life, and central values. Referring to such an episode as a "scare" implies that the concern about, fear of, or hostility toward the folk devil and his doings are out of proportion to the actual threat that is claimed.

The noun "panic" linked with the adjective "moral" does not refer to a mob's irrational, headlong, destructive flight from a nonexistent or trivial threat nor to a threat that can be readily overcome by an adaptive, cooperative evacuation. The word "panic" in the moral-panic concept is a metaphor that borrows from the stereotype of disaster imagery. In a disaster, the threat is immediate, physical, and very real. In a moral panic, the threat is slow-moving, largely symbolic, moral rather than physical, and often nonexistent.

The moral panic is a special type of collective delusion—a delusion that generates a scare or panic but with a twist. Not all collective delusions generate panic, and not all panics are moral panics. The crucial element present in the *moral* panic is the *folk devil*, deviant, or villain. In the moral panic, an evil agent is responsible for the threat or supposed threat to the public or a sector of the public. Drug dealers are spreading their seductive, insidious filth to peaceful, law-abiding communities around the country, undermining the safety and welfare of our neighbors; they should be arrested, incarcerated, perhaps even executed. To the fundamentalist Muslim, the folk devil is the West, propagandizing its poison of secularism, tolerance of other religions, women's equality, and a marginal, subservient position for Islamic culture around the world. To the committed anti-porn feminist, the pornographer and his minions are "slime" and "pimps" dedicated to the brutalization of all women (Dworkin 1981; Turley 1986, 186). The "moral" dimension indicates that more than fear is involved in the moral panic; anger, hostility, and outrage are mixed into this toxic brew. The hostility felt by its supporters, purveyors, and conveyors imparts to the moral panic a dimension of self-righteous intensity lacking in other types of panic.

Some supposed threats are, evidence suggests, entirely imaginary. Carefully and systematically weighed, available data indicate that satanic ritual abuse did *not* take place (de Young 2004), that aliens have *not* abducted humans (Clancy 2005), and that "snuff" movies are the stuff of urban legends (Stine 1999). There is, in other words, a delusional aspect to moral panics. In other moral panics, the supposed threat may be genuine, even harmful, but the alarm raised is disproportional to that threat. Even if approximately true, a claim may be exaggerated: the number of victims, the financial cost to society, how widespread the harm is, or the inevitability of the causal sequence from less to more harmful threats—any of these could be inflated. Any time large numbers of people make a false or wildly exaggerated claim, the skeptic's interest is aroused. Let's examine the evidence, we say. In the moral panic, such evidence is absent.

Actors in the Drama of the Moral Panic

How is a moral panic expressed? How do we know we have a panic on our hands? Stanley Cohen originated the concept in his analysis of a scuffle that broke out between the Mods and the Rockers, two English youth groups, in a small seaside resort town in 1964 (1972, 2002). He looked at the reaction of five segments of society: the press, the public, agents of social control or law enforcement, lawmakers and politicians, and action groups. These are the "actors" in the drama of moral panics.

The Press The media have become the most effective generators and conveyors of moral panics. Whenever the media address a story about wrongdoing with exaggerated attention, exaggerated events, inventions, distortion, and stereotyping, we've got a pretty good idea that there's a moral panic brewing. In Cohen's case, the scuffles and minor acts of vandalism that took place were accorded a status in the media far out of proportion to their importance. Not only was the focus of

Erich Goode taught sociology at New York University, the State University of New York at Stony Brook, the University of North Carolina, and the University of Maryland. He is currently sociology professor emeritus at Stony Brook and visiting scholar at NYU. Goode is the author of ten academic books, including Moral Panics *(coauthored with Nachman Ben-Yehuda),* Paranormal Beliefs, *and* Deviance in Everyday Life. *He is married and currently lives in New York City.*

attention exaggerated, but the stories describing the events also exaggerated their seriousness, repeatedly using phrases such as "riot," "orgy of destruction," and "screaming mob." In the past generation or so, however, the sources and diversity of the media have proliferated and ramified to the point where we find competing claims about a supposed threat, indeed, competing moral panics. We live, in other words, in a *multimediated* world (McRobbie and Thornton 1995). Not all media agree with one another, and a diversity of panics breaks out among different media audiences.

The Public For a classic moral panic to break out, there must be some latent potential on the part of the public to react to an issue, some raw material out of which a media campaign about a given issue can be built. The issue must have resonance with at least some sectors of the public. In September 1989, following a series of speeches by President Ronald Reagan pumping up several proposed drug bills, a *New York Times*/CBS poll revealed that nearly two-thirds (64 percent) of the American public thought that drug abuse was the number one problem facing the country at that time. Given the objectively more serious problems the country faced (inequality, poverty, the prospect of a Gulf War), this was an unlikely assertion, a huge exaggeration of a less serious problem. On the other hand, in May 1969, a rumor-panic broke out that Jewish shopkeepers were kidnapping young female customers and conveying them through underground tunnels to white slavers who sold them to Middle Eastern potentates, sheiks and other powerful, insidious types. This fanciful tale was not valorized by the press or any other media; it circulated more or less exclusively through the public by word of mouth (Morin 1971).

Law Enforcement In addition to the press and the general public, the actions of the societal control culture demonstrate that a moral panic is taking place. In no sector is this principle more clearly evident than public attitudes about what the police and the courts—law enforcement—ought to be doing about the perceived threat. Efforts are made by officers to broaden the scope of law enforcement and often increase its intensity; punitive and overly zealous actions already taken are justified on the basis of the enormity of the threat the society faces. Today, we see such forces at work in measures taken against illegal immigration and the possibility of terrorism.

Politicians and Legislators In a moral panic, legislators get into the act, proposing legislation to curb the threat. In 1986, Congress enacted a series of bills designed to control the use of illicit substances; some of these bills remain in place today. In 1988, the Anti-Drug Law called for the death penalty for major drug traffickers as well as anyone causing someone's death during the course of committing a felony. Clearly, in the late 1980s, politicians jumped on the moral panics' bandwagon.

Action Groups At some point, moral panics generate appeals, campaigns, and finally, fully fledged action groups that arise to cope with the newly existing threat. These are what sociologists call moral entrepreneurs, who believe that existing remedies are insufficient. Action groups can be seen as germinal social movements. Often, participants have something to gain from rallying against a problem, but this is not a necessary determinant. The emergence of such social action groups in the heat of the moment is one sign that a moral panic is brewing.

Disproportion in Claims of Threat and Harm

Is a post-September 11, 2001, terrorist attack as likely as some say? And does finger-pointing about the parties responsible for the terrorist acts *demonize* the parties named—namely, Arabs and Muslims? Was pornography as dangerous as critics said? Does desecrating the American flag undermine the national will and make society vulnerable to subversion and invasion? Does systematic evidence support the claim that millions of girls and young women worldwide are being kidnapped and forced into sex trafficking?

Moral panics are about locating evildoers, establishing the poisonous influence and iniquity of their actions, and rectifying the damage they've inflicted on the rest of us. The skeptic is challenged to understand what moral panics tell us about the inner workings of the society in which we live.

It's important to stress that investigating moral panics is not a debunking exercise. An analysis of a moral panic addresses the central issue of our age—indeed, of history itself: a struggle for representational hegemony. More specifically, it represents, to quote Stanley Cohen (2002), "a battle between cultural representations." All moral panics encompass claims and counterclaims by competing sectors of the society, each attempting to establish dominance over the others, to mark off boundaries in their own terms, as to where the respectable mainstream leaves off and the margins—the "outsiders"—begin. "Them" represents the folk devils and their minions and dupes, and "us" represents "deserving victims"—often, the society at large—members of the society who are threatened by folk devils. Moral panics are about locating evildoers, establishing the poisonous influence and iniquity of their actions, and rectifying the damage they've inflicted on the rest of us. The skeptic is challenged to understand what moral panics tell us about the inner workings of the society in which we live.

What About Meth?

Most skeptics know that satanic ritual abuse, alien abductions, and actual snuff movies were (and remain) figments of fantasy-prone—or hyper-dogmatic, politically committed—claimants and activists. But what about claims of threats that really do harm the society or many of its members? Beginning in the late 1980s, the media began reporting on a terrifying epidemic of a new form of an old drug—methamphetamine. The drug

was sweeping the country like wildfire. Within a few short years, the United States would be "awash" in "ice"—recrystalized methamphetamine sulfate. Methamphetamine was, according to the media in the late 1980s, the drug of choice for a "new generation." Methamphetamine would replace heroin, cocaine, and even marijuana as the nation's premier problematic drug (Young 1989; Lerner 1989). The media drumbeat continued well into the 2000s. Between October 2004 and March 2006, *The Oregonian* ran a series of over 250 stories on the horrors of methamphetamine. Steve Suo, the key reporter in these stories, became the chief advisor for the Public Broadcasting System's sensationalistic 2006 broadcast, "The Meth Epidemic." In its cover story of August 8, 2005, *Newsweek* proclaimed methamphetamine "America's Most Dangerous Drug."

"Meth makes crack look like child's play," declared one law-enforcement officer to veteran *New York Times* reporter Fox Butterfield, "in terms of what it does to the body and how hard it is to get off" (Butterfield 2004). "It makes the crack epidemic of the 80s look like kids eating candy," said another law-enforcement official to a South Carolina reporter (Williams 2006). In neither case did the official present any corroboration or empirical evidence of his claim; in a climate of fear a mere assertion, it seems, is sufficient. And like crack cocaine, methamphetamine was said to be instantly addicting. Said a Milwaukee law-enforcement official: "If you use it once, you'll become an addict" (Zielinski 2005).

In addition to methamphetamine's supposed crack-like addictive properties, news stories stressed the drug's inexorable march across the country from coast to coast and up the socio-economic ladder (Jefferson 2005). On December 31, 2004, *The Oregonian* ran a story that stated that communities east of the Mississippi had been invaded by methamphetamine and were now as swamped as those in the west and Midwest. The implication of the story was that the meth epidemic is so widespread that it is not confined to poverty-stricken rural whites but can also strike a "good" family "with two children, a six-figure income, a dog, and a Volvo in the garage" (King 2006a, 17).

Methamphetamine is a harmful drug, as anyone knowledgeable about drug abuse would agree. But is it *as* harmful as the media have charged? Does methamphetamine experimentation result in "instant addiction," as numerous news broadcasts and magazine and newspaper articles have claimed? Is it—or was it—as widely used as many media accounts asserted? Is meth among the most lethal of the illicit drugs?

To reason about drug use and abuse, researchers put together a variety of studies and measures. The federal government sponsors several nationwide data-collection efforts that give us a reasonably accurate and valid portrait of the consumption of psychoactive substances. The National Survey on Drug Use and Health (NSDUH) surveys the population at large of those aged twelve and older. Monitoring the Future surveys the drug use of eighth, tenth, and twelfth graders. ADAM (the Arrestee Drug Abuse Monitoring program) drug-tests a sample of arrestees. And DAWN, the Drug Abuse Warning System, tallies drug-related emergency department visits and reports from coroners and medical examiners on drug-related overdoses. These various data-gathering sources indicate that, although methamphetamine is the number one drug problem in some communities, especially in the West and Midwest, nationwide it does not rank among the top three most seriously abused psychoactive substances. These data sources lead the skeptical, empirically oriented observer to the following conclusions:

1. Only 2 percent of eighth, tenth, and twelfth graders have used meth in the past year; only 1 percent have done so in the past thirty days (Monitoring the Future).
2. Only 4 percent of the population aged twelve and older has used meth once or more in their lifetimes; only 0.2 percent have done so in the past thirty days (NSDUH).
3. Of all the emergency department visits to hospitals and clinics in a drug-related untoward episode, only 5 percent were attributed to stimulant use of any kind, including methamphetamine and amphetamine. Cocaine (19 percent) and alcohol in combination with another drug (18 percent) were the top two drugs in this respect (DAWN).
4. Drug-related overdose deaths are tallied according to which substance in the decedent's body, in the medical examiner's or coroner's opinion, contributed to the user's demise. Obviously, two or more drugs could contribute. Among the top drugs that cause or contribute to death by means of a drug-related overdose, we find opiates (70 percent), cocaine (43 percent), alcohol-in-combination (30 percent), the benzodiazepam sedatives (17 percent), and antidepressants (17 percent). In contrast, only 4 percent of deaths as a result of drug-related overdose involve stimulants, meth included (DAWN).
5. Roughly a third of all drug arrestees test positive for cocaine; a slightly higher percentage test positive for marijuana; about 6 percent test positive for opiates; and about 5 percent of males and 8 percent of females test positive for meth (ADAM).

In short, nationally, meth is not among the three or four most seriously abused drugs. Methamphetamine abuse has not "invaded" the suburbs or the middle class, and its use east of the Mississippi is a small fraction of that in the western Midwest states and those in the Pacific rim. Moreover, meth is not "instantly addicting"; many, indeed most, users take it moderately and episodically (NSDUH; Monitoring the Future). It is fair to say that a moral panic or "scare" erupted over the use of meth or "crank" (powder methamphetamine) and "ice" or "crystal" (the crystallized form of methamphetamine). The fear of the drug and the claims made about the degree of its devastation were out of proportion to its actual panic. It is not that methamphetamine is harmless; it is that the media claims about its use and damaging effects were grossly exaggerated (King 2006b). (For a fuller discussion of methamphetamine use and abuse in the United States, see Goode 2003.)

School Shootings

Consider, too, how the mass media exaggerated the incidence of school shootings. *The Oxford English Dictionary* refers to an epidemic as a sudden, widespread occurrence of a disease or an undesirable phenomenon, leaving open the question of how "sudden" or "widespread" it has to be. In spite of its vagueness,

however, clearly if the incidence of a disease or undesirable phenomenon *declines*, it is difficult to conceive of how the term "epidemic"—which indicates an *increase*—applies at all. Referring to an activity which is neither "sudden" nor "widespread" as an epedemic would, therefore, be an exaggeration. During the 1990s and the early 2000s, uncountable stories blared out the news of school shootings; a significant proportion of them were headlined with the chilling word *epidemic*. "An epidemic of violence," headlined CNN News on March 8, 2001, reporting the shooting-spree murder of two teenagers and the injury of thirteen others in Santana High School in Santee, California. "Incidents in Schools Rise Sharply," the headline announced. Dan Rather agreed; following the Santee killings, the *CBS Evening News* anchorman stated: "School shootings in the country have become an epidemic." There seemed to be no doubt about it: school shootings appeared in the news much more than in the past, they were presented by the media as rising in number, and the society was depicted as being in the midst of an epidemic. The multiple killings in Jonesboro, Arkansas, in 1998; Columbine, Colorado, in 1999; Santee, California, in 2001; Red Lake, Minnesota, in 2005; Paradise, Pennsylvania—in an Amish school—in 2006; and in Success Tech Academy in Cleveland, Ohio, in 2007, seemed to bear out these assertions. The list seemed endless. But the reality is quite different.

Skeptics reminded the public that school shootings may not be as "epidemic" as much of the media claimed. Joel Best, a sociologist, has demonstrated that although the number of both rose and fell on a year-by-year basis between 1997 and 1999 and the number of stories in major newspapers on school deaths in the United States increased by eight times, between 1998 and 2001, the actual number of violent school deaths (accidents and suicides excluded) plummeted from thirty-five to fifteen. We are in the midst, Best says, of a "phantom epidemic" (2002). Dewey Cornell (2006), a forensic psychologist, points out that between 1993 and 2002, the number of juvenile arrests for murder dropped from 3,284 to 973, and the victims of school homicides dropped from forty-two in 1993 to eight in 2001, two in 2002, and four in 2003. The fact is, for school children nationwide, schools are safer places to be than homes; a small number of newsworthy, high-profile cases of violence do not represent the country as a whole. School violence actually substantially declined between the 1990s and the 2000s. There was and is no "epidemic" of school violence, and by using the term, the media exaggerate its incidence; in fact, during this period, the media fabricated a moral panic of school shootings.

A Potpourri of Moral Panics

Moral panics erupt from time to time in every society, deluding many people into thinking that something serious must be done about a nonexistent or exaggerated threat and that drastic steps must be taken to exert social control on the miscreants responsible. As skeptics, it is our responsibility to assess the nature of these threats and understand where such accusations are coming from.

Did cocaine cause Black men to become criminally violent and lustful toward white women, not to mention invulnerable to bullets fired by the police, as was claimed at the turn of the nineteenth century, especially in the south (Musto 1999)? Did comic books, especially horror comics, cause juvenile delinquency, as many claimed in the 1950s (Wertham 1954; Hadju 2008)? What function does an exaggeration of the threat of crime serve—and whose interests does it serve—at a time when the crime rate is precipitously declining (Lee 2007)? In an age when cities have become safer than they've been in decades, why now has a panic developed around the theme of the corruption and dangers of the country's urban spaces (Macek 2006)? Are we worried about the wrong threats (Glassner 1999)? Are we trying to demonize and punish the wrong enemies? These rhetorical questions address the central place of the moral panic in any skeptic's conceptual tool kit to help understand how mistaken claims are made, believed, circulated, and exert their seductive appeal.

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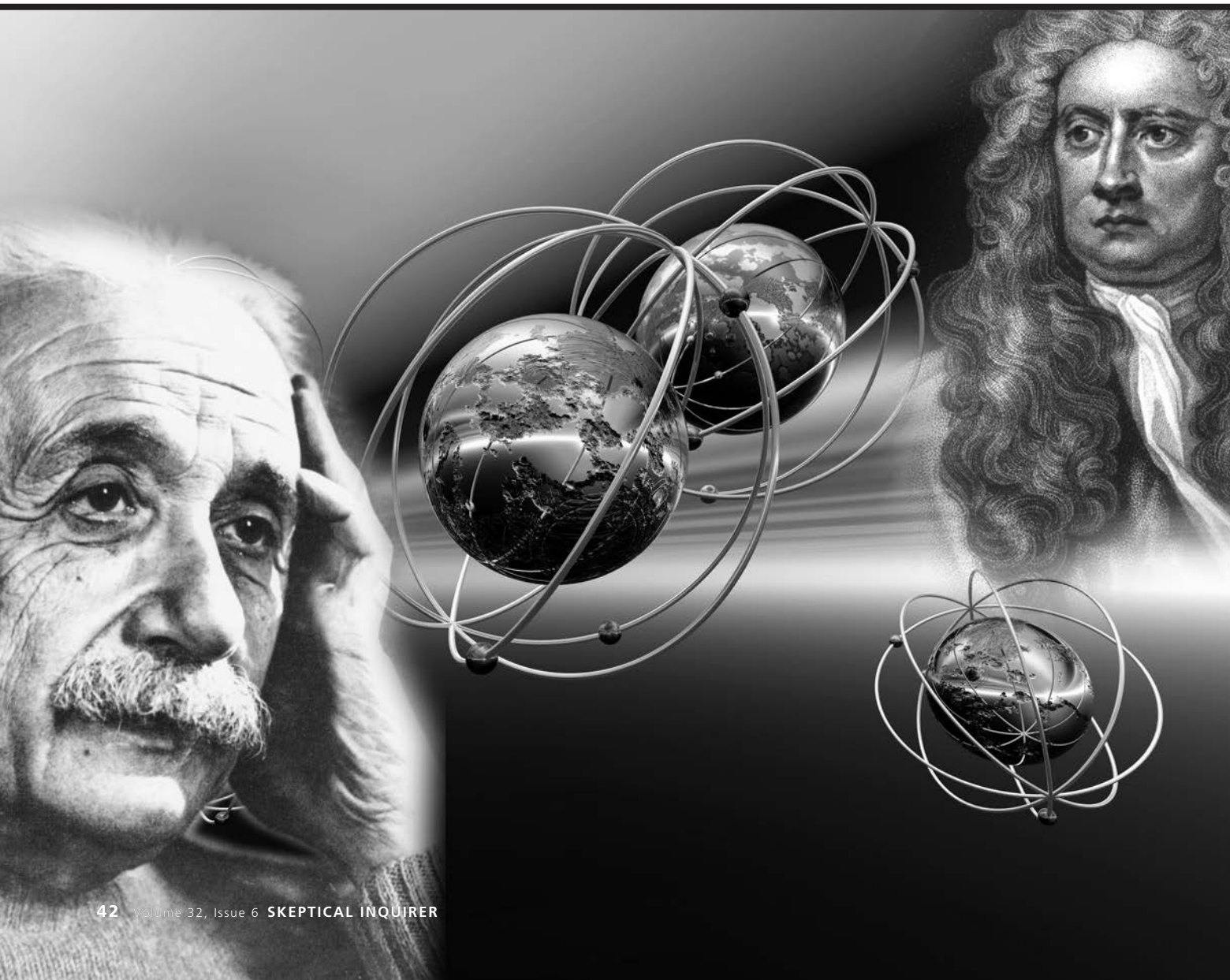
Quantum Weirdness

An Analogy from the Time of Newton

What Einstein called "spooky action-at-a-distance" in quantum physics has similarities to the "action-at-a-distance" that bothered people in Newton's time. It deserves the same fate.

PAUL QUINCEY



"Anybody who's not bothered by Newtonian gravity has to have rocks in his head."

The above is not a genuine quotation, but I hope you will agree that it is a fair summary of the original, made over three hundred years ago: "That one body may act upon another at a distance through a vacuum, without the mediation of anything else . . . is to me so great an absurdity, that I believe no man, who has in philosophical matters a competent faculty of thinking, can ever fall into it."

This quotation highlights the controversy that surrounded Isaac Newton's theory of gravity, put forth in his astonishing book *Principia*, published in 1687. His theory says that anything with mass exerts an attractive force on anything else with mass, depending only on the masses and their separation in a very simple way. Through virtuoso mathematics, Newton showed how this force accounts precisely for the known motions of the planets, the comets, the moon, and the sea.

His book does not attempt to explain how this "action-at-a-distance" actually works—indeed Newton makes a point in *Principia* of saying that he would not speculate on this. He used the Latin phrase "hypotheses non fingo," which can be loosely translated as "shut up and calculate."

You might think that the quotation mentioned earlier came from one of the many philosophical critics of Newtonian gravity, perhaps Newton's great German contemporary and rival Gottfried von Leibniz, but you would be wrong—the words were written by Newton himself. Newton was very bothered by the issue of how a planet could "know" about the sun's gravitational pull without something physically giving it a nudge, and he tried hard to invent a plausible mechanism. One such mechanism he proposed was a fluid that fills all space—the ether—which is somehow sucked toward the sun, tending to carry the planets with it and thus keep them in orbit instead of flying off. Needless to say, this idea does not stand up to scrutiny, which is why Newton wisely left it out of *Principia*.

In fact, Newton and Leibniz had very similar views on the plausibility of gravity as a force without a mechanical agent. As Leibniz put it: "if [gravity] transpires without any mechanism . . . then it is a senseless occult quality, which is so very occult that it can never be cleared up, even though a Spirit, not to say God himself, were endeavoring to explain it."

Why are these quaint problems from the ancient history of physics worth mentioning? There are two related reasons. First, the borderlands of scientific knowledge have always contained some ideas considered virtually supernatural at the time, and it is instructive to see with hindsight how such ideas are ultimately accepted or rejected by mainstream science. Second, there are illuminating parallels between gravity and quantum theory that may help us come to terms with the current philosophical difficulties surrounding quantum theory.

Whatever Happened to the Problem of Action-at-a-Distance?

If we accept that Newtonian gravity was considered seriously weird 300 years ago but is seen as simple and old fashioned now, what happened to change people's minds? I suggest five possibilities:

1. Gravity, in the sense of a force between distant, separate objects, was shown to be an illusion and does not really exist.
2. Gravity is both real and weird, but a conspiracy of small-minded scientists has persuaded everyone that there is nothing wrong, because they cannot bear to admit that there are phenomena they cannot explain.
3. A crucial experiment, unknown to Newton, showed how gravity works and that it all makes sense.
4. A new theoretical idea (the gravitational field, curved space-time, or gravitons, perhaps) showed that gravity acted without a problem with action-at-a-distance after all.
5. After a while, people forgot why they found the idea so weird and moved on to other things.

It is my impression that most physicists, if they thought about it at all, would subscribe to the fourth reason on the list—the idea that physics moved on in a way that solved the problem of action-at-a-distance. For instance, by the nineteenth century, the idea of space as empty was replaced by the idea that it contains, at every point, a gravitational field. And so gravity does not act mysteriously across a vacuum—there is something in the vacuum that does whatever it needs to do.

Unfortunately, the truth is not so simple. The gravitational field is something that has strength and direction at every point, determining what force affects any passing mass at that point. The field does not transmit the force like Newton's ether; it provides information about the force. But how does the field adjust correctly at every point? Instead of the object responding to distant masses, we now say that the field responds to them instead. Furthermore, there are no measurable consequences of the existence of the field that differ from the old action-at-a-distance view of gravity, which of course worked remarkably well all along. Newton and Leibniz would have seen the gravitational field for what it is—a mathematical device that has its uses but doesn't help with the underlying philosophical problem.

However, we don't have to rely on the gravitational field, because we can move on to the improved theory of gravity that replaced Newton's theory—Einstein's General Theory of Relativity, published in 1915. In this view, there is no grav-

Paul Quincey is a physicist at the National Physical Laboratory in the United Kingdom. E-mail: paul.quincey@npl.co.uk. Some related articles can be found at http://quantumhindsight.wordpress.com/.

itational force across empty space. Matter causes space-time itself to curve: objects move in curved paths accordingly, and the problem is solved. We know that the new theory is correct because there are observable differences, like the detailed motion of the planet Mercury.

And yet the fundamental question remains more or less unchanged—how does the Sun make space-time curve by just the right amount near the Earth, 93 million miles away? In practice, there is little conceptual difference between curved space-time and the gravitational field. Nobody said at the time: "Gravity is explained by the curvature of space-time—physics is no longer weird!"

While ideas have indeed moved forward, the main reason that action-at-a-distance no longer bothers people is the fifth option. In Newton's time it was an unquestioned assumption that there could be no force without contact, partly from experience and partly because to think otherwise appeared to open the door to all kinds of "occult" forces. In these days of mobile phones and television remote controls, the idea is no longer disturbing, and we can see how such forces act without making our familiar world fall apart—indeed our world wouldn't be the same without them.

The Problem of Quantum Mechanics

Of course, 300 years is a long time in physics, and we cannot compare past intellectual problems with current ones. The twentieth century was so much more sophisticated than the seventeenth. Everybody knows that quantum mechanics really is weird, and no amount of explanation can change this simple fact—just look at the quotations:

> "Those who are not shocked when they first come across quantum theory cannot possibly have understood it."
> —Niels Bohr
>
> "Anybody who's not bothered by Bell's theorem has to have rocks in his head."—Arthur Wightman (A description of Bell's theorem, and its relevance to quantum physics, is given below.)
>
> "I think I can safely say that nobody understands quantum mechanics."—Richard Feynman

Now, quotations are useful things, but they are not what good science is about. In fact, the idea that scientific questions are settled by finding statements made by great scientists—by appealing to authority—is the opposite of science. After all, didn't Einstein say, "Unthinking respect for authority is the greatest enemy of truth," and "To punish me for my contempt for authority, fate made me an authority myself"? I rest my case.

Another problem with relying on quotations is that it is often possible to find contradictory views expressed by the same person. Niels Bohr, more than any single person, spread the idea that the interpretation of quantum mechanics was a job completed in the 1920s, causing Murray Gell-Mann to comment in 1976 that "Niels Bohr brainwashed a whole generation of physicists into believing that the problem [of the interpretation of quantum theory] had been solved fifty years ago." Bohr evidently thought that the shock of encountering quantum mechanics would soon wear off.

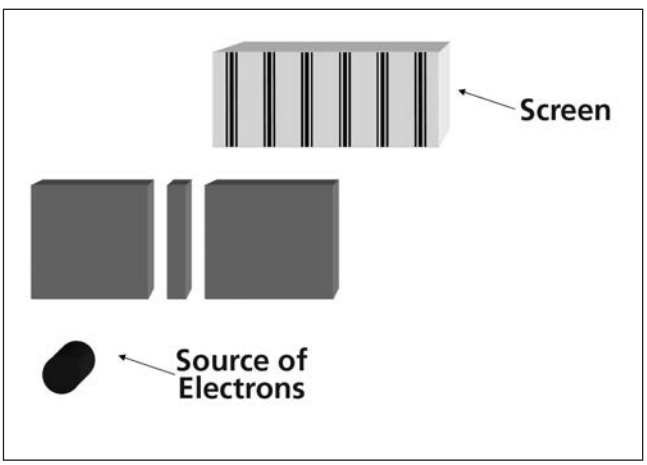
Richard Feynman, too, in his later years expressed a very different view of quantum mechanics from the one quoted above, saying in 1982: "We have always had a great deal of difficulty understanding the worldview that quantum mechanics represents. . . . You know how it always is, every new idea, it takes a generation or two until it becomes obvious that there's no real problem. I cannot define the real problem, therefore I suspect there's no real problem, but I'm not sure there's no real problem."

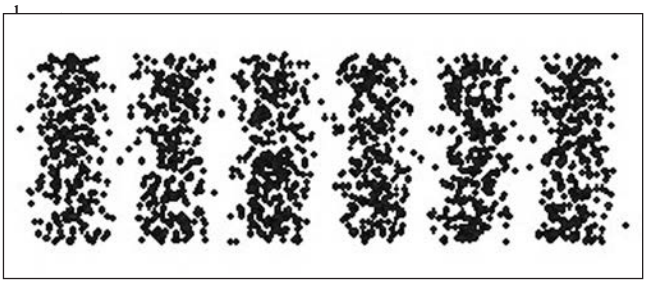
So rather than rely on a few quotations to confirm the weirdness of quantum mechanics, it is far better to concentrate on the evidence for it. And as Feynman implies, this is not a straightforward task.

There is no single definitive example of quantum weirdness. For many years, the best example was "single particle interference," usually presented as the double-slit experiment. In recent decades, more subtle phenomena based on separate but correlated events, grouped under various banners such as Bell's theorem, EPR, and entanglement, have taken center stage. I will consider these two categories briefly, in turn.

Single Particle Interference

Richard Feynman described the double-slit experiment as the only mystery in quantum mechanics. It is well described in all good presentations of quantum mechanics—if you need a specific example, you cannot really improve upon Chapter 37 in Volume 1 of *The Feynman Lectures on Physics*. The weirdness is summarized by the illustrations below. If particles are aimed at a barrier containing two slits, in the right circumstances they will form a pattern on a screen behind the barrier, like the one





The screen in detail.

The difficulty is not in describing what you see—it is a pattern of stripes—but in explaining how they could possibly arise. The particles can be seen arriving one by one, building up the pattern randomly. How can the particles form a pattern that depends on there being two slits, when each particle can surely only be affected by one? And, if we stop worrying about that, how can large numbers of particles, separated in time, cooperate to make sure the right pattern is formed?

When the result is simple to describe but impossible to explain, chances are that we have begun our explanation in the wrong place—we must question our assumptions. One assumption that we tend to make is that every event can be predicted in advance. This is essentially a neo-fatalist assumption that all events are inevitable and that there is only one possible version of the future. This may be true, but it is far from proven, and most of us don't actually subscribe to this belief as we live our lives. The pattern is much less mysterious if we assume instead that the destination of each electron is not fixed in advance but only governed by probabilities. This covers the second question.

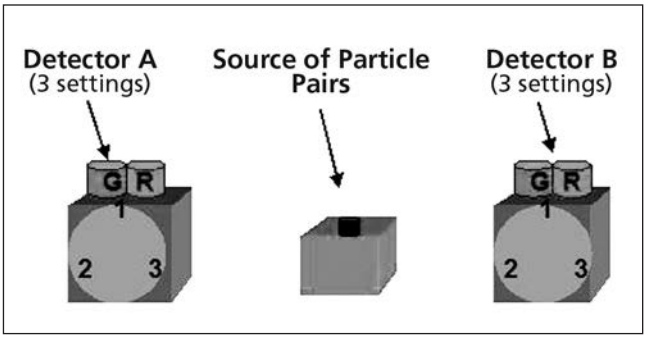
The first question is more interesting. The pattern is similar to what is seen when two waves interfere—like ripples on a pond—as if each particle changes into a wave and passes through both slits at once before hitting the screen. It is better explained as a consequence of the surveyor's wheel mechanism described in my earlier SKEPTICAL INQUIRER article (Quincey 2006). The mechanism calculates the probabilities for particles to end up at different destinations without the need for the particles to morph into waves, and it makes no distinction between situations normally labeled either "classical" or "quantum." However we choose to describe it, though, all we are really saying is that particles follow rules as they move from place to place. We may find it weird that particles (or rocks, for that matter) follow rules, but then we may just as well find it weird that the sun rises every morning.

Single particle interference is, to me, the best and clearest example of quantum behavior—simpler to describe and actually harder to explain than examples based on Bell's Theorem.

Bell's Theorem, or Quantum Sudoku

The second type of quantum weirdness was first highlighted by Albert Einstein, Boris Podolsky, and Nathan Rosen (EPR) in 1935. There is an excellent presentation of the problem in an article by David Mermin (1985), whose approach I have followed here.

The central feature is a device (the central box in Figure 2) that creates pairs of particles, the particles of each pair flying away from each other. They head toward detectors positioned to either side, which are entirely independent of each other and can be far apart. Some property of each particle triggers one of two responses in the detector indicated by a green or a red light (G or R), so when each particle pair is created, let us say by pressing the black button in the center, one of the two lights flashes on each detector shortly afterwards. Crucially, each detector has three settings, each measuring a different property of the particle, and these settings are changed randomly and independently before each run. The results from an experiment of this type look like the tables below—a series of settings and



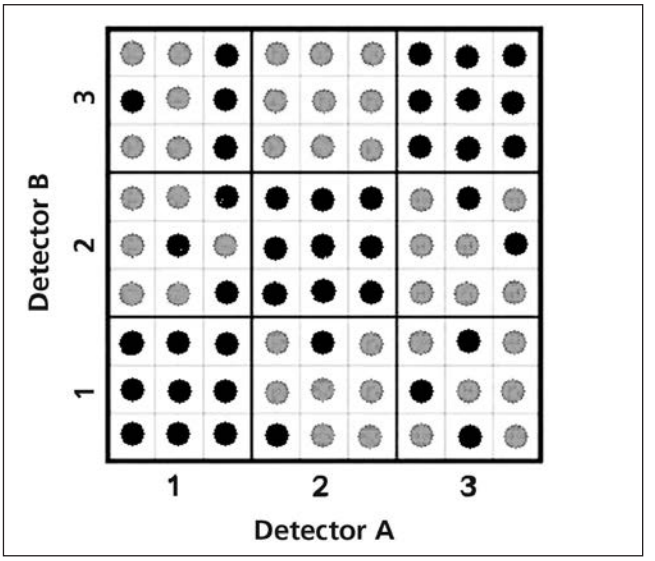
A																			
	1			R			R	G	G		R				G		R		R
	2	G		R	G													G	
	3		R							G		R	R	G		R			

B																			
	1			R								G					R		
	2					G			R	R	G				R		R		

flashes from Detector A and a separate series from Detector B.

Figure 2: Schematic of an experimental test of Bell's theorem with typical results below.

So where does the weirdness come in? To see it, it is helpful to present the results in a different way. Take a three-by-three grid with a square for each of the nine ways the detectors could have been set (A on 1, B on 1; A on 1, B on 2, etc.). For each run, put a mark in the appropriate square—a dark one if the two lights flashed the same color, or a light one if they were different. Figure 3 shows an example in which the first nine runs



for each of the nine settings are recorded.

Figure 3: Bell's theorem test results presented on a convenient grid.

The results here have been invented, but they represent what happens when a carefully chosen experiment is conducted in a laboratory. They show something that is about as weird as

physics gets, although you can be forgiven for not noticing. The pattern that emerges when this experiment is repeated many times is this: when the settings on the detectors are the same, the lights always flash the same color, while in all other cases the lights only flash the same color a quarter of the time. What makes this truly weird is that if you make superficially reasonable assumptions about what must be going on, you would expect this last fraction to be around half, and certainly no less than a third of the time—definitely not a quarter of the time. The fact that there is a clear difference between results predicted by quantum physics, now confirmed to be the same as the results of real experiments, and those predicted by any theory that makes the superficially reasonable assumptions was discovered by John Bell and is called Bell's Theorem.

Should we be bothered by this? Being bothered shows we are clever enough to understand the logic,[1] but as in the case of the double slit, if an observation is impossible to explain, we are probably making the wrong assumptions.

The two assumptions that make the results mysterious are usually called "locality" and "reality." The first, in effect, says that things cannot form conspiracies without being able to send signals to one another. The second says that any properties of particles, like the ones measured by the detectors, are defined at all times, even when they are not being measured. Einstein took the reality assumption for granted, so this sort of result implied non-locality. He called this "spooky action-at-a-distance."

With hindsight, it is the restrictive idea of reality that is the root of the problem. To restate a point made earlier, if we accept that there are different possible versions of the future, any properties of particles in the future will exist only as a mixture of probabilities. So before they are measured, the properties are indeed undefined and hence not real in the sense that is needed to make the results weird. We can, if we like, see results from tests of Bell's theorem as confirming experimentally what we instinctively feel—that the future is genuinely uncertain until it happens. The choice we are presented with is not between a conspiracy and a reality that falls apart when we try to come to grips with it—it is between a conspiracy and a reality that falls into place, bit by bit, just in time. The world may not be as real as we might like it to be, but it is as real as it needs to be.[2]

This argument could be said just to transfer any weirdness into a magical process that transforms a mixture of possibilities into a single result in the moment we call the present. This is indeed magical, but it is a kind of magic that we experience all the time. We can make it seem more exotic by dressing it up as quantum physics, but the underlying magic remains the same.

A Posthumous Last Word from Newton

To return from spooky action-at-a-distance to the old non-spooky variety, perhaps Newton had something to say that is relevant to the conceptual difficulties with quantum mechanics. In *Principia* his final word on action-at-a-distance was this: "It is enough that gravity does really exist, and act according to the laws which we have explained, and abundantly serves to account for all the motions of the celestial bodies, and of our sea."

We could use this almost word for word as a statement about quantum mechanics:

"It is enough that quantum mechanics does really exist, and act according to the laws which we have explained, and abundantly serves to account for all the observations of elementary particles, and of our world."

Notes

1. The logic is explained very neatly in Mermin's article.

2. Any set of future possibilities will have some general constraints, for example, that the total number of some type of particle remains the same. This being the case, the future is both unreal and non-local, in the sense that an actual event at one place has immediate consequences for other places. This amounts to little more than noting that this time next week I could be in many different places, but I will only ever be in one place at a time.

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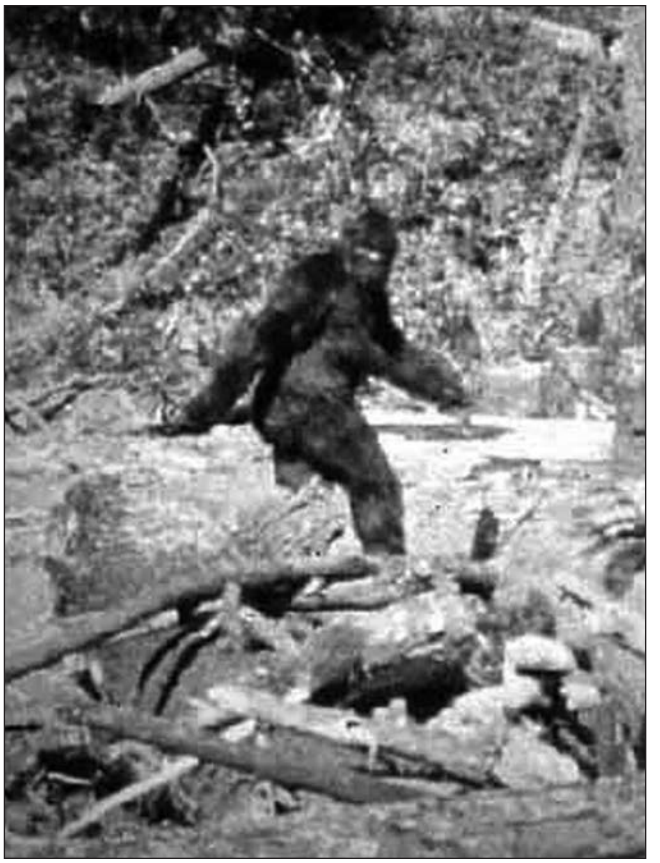
Science and Footprints

A recent article in a scientific journal argues that alleged footprints from the Patterson film site provide evidence for Bigfoot. A review of the circumstances suggests a different conclusion.

MICHAEL DENNETT

In 2007, D. Jeffrey Meldrum, a professor at Idaho State University, published a paper in a scientific journal[1] arguing that footprints from the site where Roger Patterson filmed his infamous 1967 Bigfoot footage support the idea of a giant North American ape. He has even given it a scientific sounding name: *Anthropoidipes ameriborealis*. Crammed with scientific jargon, the paper repeatedly refers to casts of footprints located at the Smithsonian Institution. Meldrum, quoting the editor of *Nature*, notes that perhaps it is "time for cryptozoology [the study of unknown animals] to 'come in from the cold.'" To complete the impression of scientific accountability, Meldrum writes, "Much of the more serious literature on the subject [of Bigfoot] has been written by bona fide scientists with anthropological or biological credentials from recognized institutions."[2]



A frame from the "Bigfoot" film shot in Bluff Creek, California, in 1967 by Roger Patterson and Bob Gimlin.

To understand the significance of the Meldrum paper, a little background is needed (for a good overview, see Benjamin Radford's article "Bigfoot at 50," SI March/April 2002).[3] Among supporters of the idea that North America is home to a giant bipedal ape, known as Bigfoot or Sasquatch, almost all agree on the authenticity of the Patterson-Gimlin film. The 952 motion-picture frames, allegedly shot by Patterson on October 20, 1967, and seen many times on television, is considered the most impressive evidence for the existence of the giant creature—the star "proof" in almost every book making a case that Bigfoot is a real animal. Unfortunately, the distance of the "ape" figure from the camera and the resolution of the film (the original transparencies are only 16mm) limit the film's practical value.

The image is striking; even some skeptics are impressed with the footage. But several issues, besides a complete lack of subsequent corroborative evidence, cast doubt on the film's authenticity. Significant and troubling is the fact that the original film is missing. More importantly, three key issues cannot be resolved. According to Patterson and his partner that day, Bob Gimlin, the film was "mailed" from California on a Friday evening (approximately 9 P.M.) and arrived in Yakima, Washington, the next day. Supposedly processed on Saturday at an unidentified photography lab, the film was viewed by several Bigfoot buffs (including the late René Dahinden and John Green) on Sunday. The two surviving witnesses to these events, Bob Gimlin and Patterson's brother-in-law and financial partner Al Detley, have been unable or unwilling to explain how the film got to Yakima so quickly (in an era before overnight couriers), how the film was processed so quickly (in a time when development normally took a week), or even where the processing took place.[4] 48

Patterson's sketchy reputation looms over all of these issues. Most Bigfoot believers admit that Patterson was no one's choice for a reliable witness. In his authoritative 1992 monograph on the film ("Bigfoot at Bluff Creek," a *Bigfoot Times* special), Daniel Perez, perhaps the film's strongest supporter, called Patterson "shady." Other Bigfoot investigators have not been as complimentary.

A recent book by Greg Long, *The Making of Bigfoot*,[5] 48cast further doubt on the film. Long establishes in his book that Patterson was shadier than even most of those familiar with the story imagined. Of course, just having an unseemly past does not make the man a hoaxer, but Long convincingly portrays Patterson as a man with the ability, aptitude, and motive to fake a Bigfoot film. Through multiple interviews with people, both friends and acquaintances of Patterson, Long creates an unflattering but believable image of the most important man to the Bigfoot story. Long bolsters his arguments with objective data such as court records, contracts, and photographs.

Meldrum claims that "both the [Patterson] film and the tracks

Michael Dennett has followed the legend of Bigfoot for more than a quarter of a century from his home in the Pacific Northwest. He is a Committee for Skeptical Inquiry Scientific and Technical Consultant. E-mail: mdennett@weci.com.

Figure 1. Copy of one of the casts of the "tracks" from the Patterson film site.

Figure 2. Elevation view of the same cast showing a remarkably deep impression with the maximum depth just behind the ball of the foot.

[supposedly recovered at the site] have been intensively studied by numerous researchers." But do the plaster casts really lend support to Patterson's account?

A careful examination of the circumstances of the footage suggests instead that the footprints are a hoax.

A little background is necessary. Purported Sasquatch footprints, in most instances, lack a chain of custody. The impressions are not normally associated with a specific individual, nor are the environmental conditions or context of the time the prints were made usually known. The moisture content of the soil, soil mineralogy, organic content, grain size, or the mode of traverse by the animal (was it bounding across the terrain or tiptoeing) are seldom reported. In the case of the Patterson film, we need not speculate on any of these parameters, because the film site is available and we know the alleged creature's gait, the conditions at the time, and many other factors.

Although Patterson is now dead, his filming partner Bob Gimlin (who supposedly stood nearby with his rifle ready) gave a detailed account of the events on several occasions.

Author John Green interviewed Gimlin in 1992 and videotaped the session. In 1997, the interview was transcribed and published on Bobbie Short's Bigfoot Web page[6] and through this interview we get Gimlin's story.

"I rode the big horse," he tells Green. "The horse that I was riding was around 1,200–1,300 pounds. I rode him along side the [Bigfoot] tracks with this new film in the camera [and] Roger took pictures of how deep the horse's prints were in the soil compared to the creature's tracks. Then I got up on a stump, which was approximately three to four feet, you know? We didn't measure it, probably should have. Anyway, I jumped off with a high heel boot as close to the track as we could. Then we took pictures of that to illustrate the depth that my footprint went into the same dirt with a high heel cowboy boot, and at that time I weighed 165 pounds. These were all things that we did prior to leaving the scene."

Were the plaster casts of the creature's alleged tracks made on the same day? Gimlin answers, "Yes we did, in fact right that afternoon. By the time we got the tracks cast . . . it was getting late."

Green asks, "[Do you] remember how deep the horse tracks were compared to that of the Sasquatch tracks?"

Gimlin replies, "The horse tracks were not as deep as the Sasquatch tracks of course. I just walked the horse through. I walked him as slow as I could but you figure he is distributing his weight on four feet. The tracks were better than half as deep but they weren't as deep as the tracks of the creature."

At this point in the interview, Green notes a contradiction in Gimlin's account and asks him, "You have estimated this thing [at 300 pounds] a great deal less than the horse and yet the footprints were deeper, what explanation could you think of?"

Gimlin replies, "there was no way of really knowing. We knew it had to be heavier than it appeared to be when we first saw it. Of course, we thought the horse's weight was distributed on four feet, and I'm not good with the mathematics of such things, but . . . if you figure 1,400 pounds [for horse and rider] distributed on four feet would be about 350 to 400 pounds, so we figured it must have weighed much more than we originally figured."

The fact that something is seriously wrong with Gimlin's account should have been obvious to Bigfoot researchers. A horse is a big creature, and because its feet are relatively small in comparison to its weight, a horse makes deeper and more visible tracks than almost any other animal. The depth of an impression is not only based on the weight of an animal but also on weight distribution as a function of foot size and downward force at a given point, which is expressed in terms of pounds per square inch.

Is Gimlin's account credible? Forest Service worker Lyle Laverty, who was on the scene the following Monday, said he "walked along the sand adjacent to the tracks and didn't come anywhere close to sinking to that kind of depth."[7] 49

Laverty also took photos of some of the impressions showing they were about one-inch deep in the substrate, something confirmed by duplicates of the original casts (see figures 1 and 2).[8] 49

Recently when I talked with Laverty, he confirmed his statement about the depth of the tracks. To clarify, I asked, "And the horse's hoof prints were deeper than your foot prints?"

"Of course," he answered.[9] 49

John Green viewed a second film reportedly showing the making of the casts. In his 1978 book Green notes that "There was also some film taken later when they were making casts of the tracks. It seems to have shown that when the men walked beside

Figure 3. View of a horse's hoof. This is a photo of one of Spencer's hooves. Note most of the hoof area is recessed.

Figure 4. Full view of Spencer, a horse similar in size to the one descibed by Gimlin in his account.

the tracks their feet did not sink appreciably into the packed sand. The prints of the creature on the other hand, sank about an inch deep, indicating tremendous weight. Its feet measured fourteen inches in length, five inches in width at the ball, and four inches at the heel. *The prints were flat*[10] [emphasis added], and there were five toes of fairly human pattern, except that there was less difference in size from largest to smallest. The men [Patterson and Gimlin] made beautiful casts of both left and right feet."[11,12]

Gimlin is correct when he says he is not good with numbers; let us do the math. For an experimental comparison, I obtained tracings of the footprint of several horses,[13] 50and their size, weight, and hoof measurements agree with Gimlin's description of his horse. From the interview Gimlin tells us, "the hoof print area, if you're familiar with sizes of horses' hoof prints, well the horse wore a size one shoe, which is not quite six inches in diameter, probably more like five inches in diameter with a number one shoe on the front feet. The shoes were a little bit smaller on the back feet. They were size ones trimmed down is what they were." At another point, he describes his horse as sixteen hands high.

The three horses in my sample were 15.3 to 16.1 hands high, and all had hooves approximately five inches in diameter. Asher, a 16.1-hands-high horse who weighs about 1,300 pounds and wears a size one shoe, was the closest fit. Asher's hoof covers an area of 20.5 square inches. Of course, horses make the impressions as they walk or run, which means when they are walking they distribute their weight on two or three feet. The surface area of three of Asher's hooves is 61.5 square inches. (The two other horses had a total area for *three* hooves as follows: Jasmine 63.6; Sonny 64.5 square inches.)

What about the surface area of the purported Sasquatch foot? With a copy of the figure's alleged footprint, it is easy to compute its[14] supposed displacement.

The figure in the film is placing its weight on one foot at a time, so we must compare a single foot with two or three from a horse. But, the fourteen-inch monster feet each cover 66.3 square inches of surface area! (The plaster casts from the film site and Green's description confirm the entire foot made the impressions.) Using these simple calculations, one alleged Sasquatch foot roughly displaces about the same area as a horse does. So, *if* the figure made an impression the same depth as Gimlin's horse, and using this simple reckoning, we could gauge its weight to be 1,400 pounds!

The true measure is more complex.[15] 50

Seldom will the entire surface area of the hoof actually come into contact with the ground, because the inner hoof is recessed, especially so once the hoof is shod (see figure 3). In reality, since the horse distributes its weight on two or three sharp-rimmed hooves, normally only the horse's shoe touches the terrain. The figure in the film, however, distributes weight on one broad, padded, round-edged foot, allowing a maximum surface area to make contact with the ground. This means that the foot of the figure in the film will make less of an impression per more weight than a horse.

Even if we base our comparison on the entire area of three hooves, we get a measurement of about 22.7 pounds per square inch for Gimlin's horse. If the figure in the film applied the same pounds per square inch, it would have weighed 1,505 pounds.[16] 50

This calculation works if the impressions were the same depth as a horse, but from all indications (photos, film, and testimony), they were not. We are told they were noticeably deeper. This means the creature in the film had to exert more downward force than the horse. If the force exerted by the figure in the film was 1.5 times our estimates, that would yield 34 pounds per square inch. This means the creature weighed 2,254 pounds *if* the earth compacted evenly. As sediment compacts, it causes more resistance to penetration in a nonlinear progression. In this case, we know the surface material compacted enough to support a horse hoof at a shallow depth, meaning the filmed subject would have needed to exert even more pressure on the sediment!

Could the Bigfoot in the film realistically displace the weight needed to make the impressions? For this assessment, we must take into account that the figure is allegedly a female Sasquatch (some claim to see its furry breasts) about to winter in Northern California. The images suggest a thick coat of fur. Fur accounts for little weight. The creature would have to bulk up with a layer of fat, and fat accounts for far less weight than muscle. We don't know how tall the figure is, but Roger Knights, an active

Figure 5. The copy of the Patterson film site cast next to Spencer's front hooves.

Bigfoot booster, has recently taken a look at this issue. According to Knights, "we are probably looking at maybe six feet at most." Gimlin's original estimates were "six-feet one-inch or six-feet two inches."[17] 51

Others envision the subject as taller. According to longtime Bigfoot enthusiast Peter Byrne, the creature's height is somewhere between "Jim McClarin's [another Bigfoot enthusiast] height estimate of eighty inches and mine of seventy-seven inches. This would give the figure in the footage [an average] height of six feet, six-and-a-half inches. This is the maximum that I would allow."[18] 51

When one views the image, does it look like an animal, whatever the height, of such enormous weight? If we could accept that this figure made these incredibly deep tracks, shouldn't there have been many more impressions found just before and after the event? According to Laverty, "there was some skepticism, because we had been up and down that same road all summer long and never saw anything . . . and then all of a sudden Mr. Patterson comes in for a couple of days and bang! Yeah, I think there was some skepticism."[19] 51

Gimlin would have us believe the creature in the film is of enormous weight.

Isn't a hoax more plausible? Is it possible Patterson and Gimlin conceived a way of making deep impressions before they left Yakima?[20] 51

Readers must draw their own conclusions, but this track depth analysis casts additional scientific doubt on the Patterson film. In view of the litany of discrepancies swirling around the film's origin and circumstances, the revelations in the Long book, and this evidence of possibly faked tracks, we are exceptionally close to a judgment against the authenticity of the film.

Notes

1. New Mexico Museum of Natural History and Science, *Bulletin* 42, 2007. Lucas, Spielmann, and Lockley, editors.

2. In the paper, Meldrum makes bold statements about the Patterson film, such as "several footprints were clearly filmed." Because Meldrum does not mention the "second film" allegedly made later in the day, the readers of the paper would assume this statement refers to the film including the figure. He labels a clear photo from the second film simply as "from the Patterson-Gimlin film clip . . ." leaving the uninformed reader to believe this *still* is from the film showing the figure.

3. The best book-length account of the legend of Sasquatch is *Bigfoot Exposed* by David J. Daegling, 2004, AltaMira Press, Walnut Creek, CA.

4. These issues are the result of troubling questions raised by Bigfoot believers.

5. *The Making of Bigfoot* by Greg Long, Prometheus Books, Amherst, New York, 2004.

6. For the complete interview go to www.bigfootencounters.com/interviews/john.htm.

7. *Bigfoot Times*, October 20, 1992, page 22, and personal conversations with Lyle Laverty.

8. I am indebted to Don Ryan for the loan of his copy of one of the Patterson film scene casts as well as for many other favors concerning this investigation.

9. Subsequent telephone conversation with Lyle Laverty on February 16, 2007.

10. In his paper, Meldrum confirms: "the footprint is notably flat . . . presumably to maximize distribution of the plantar pressures at the onset of touchdown." *N.M. Museum Bulletin* 42, 2007, Page 228.

11. *Sasquatch: The Apes Among Us*, by John Green, Hancock House, Saanichton, B.C. Canada, 1978, page 118.

12. Elise Kirk, an associate producer with National Geographic Television, asked several questions about the footprints associated with the Patterson film when she interviewed me while making a film on Bigfoot. Her insightful questions caused me to reexamine the way I viewed the impressions.

13. I had help from two horse aficionados: Nancy Stutzman and Christy Sanders-Meena. The horses cooperating in my initial survey were Sonny, Jasmine, and Asher. Asher weighs about 1,300 pounds; Sonny, the smallest horse, weighs about 900 pounds, and Jasmine about 1,100 pounds. Later, for photos, a four-year-old named Spencer posed for comparison with a copy of the Patterson cast. Spencer is almost sixteen hands high and weighs about 1,100 pounds.

14. For those readers who have not examined the film image in detail, the figure in the film has large, fur-covered breasts. It is the consensus of the Bigfoot community that the creature is allegedly female, one of the few issues skeptics do not dispute.

15. Not factored into the calculations is the body shape of a horse. Unlike a primate who displaces all of its weight evenly but alternately on each foot, approximately 60 percent of the body mass of a horse is distributed over the front legs, due to the size of the head and neck. Of course, this means the weight per surface area is even greater than the number given in my calculation, making the case even stronger against the authenticity of the Patterson tracks.

16. I am indebted to Anton Wroblewski for comments about the details related to the mechanics of human and horse footprints and many other helpful suggestions.

17. *Big Foot-Prints* by Grover Krantz, Johnson Books, Boulder, Colorado, 1992, page 96.

18. *The Search for Bigfoot Monster, Myth or Man?* by Peter Byrne, Acropolis Books Ltd., Washington D.C., 1975, page 141. To be fair, there are many other height estimates. The late Grover Krantz, using film speed as a measure of height (a most unimpressive argument), calculated the image between 5-feet-9.3-inches and 8-feet-6-inches tall (see Big Foot-Prints, page 96). Patterson claimed the creature was 7-feet-4-inches tall and in the 1992 interview Gimlin revised his estimate of the creature to "about 9-feet high."

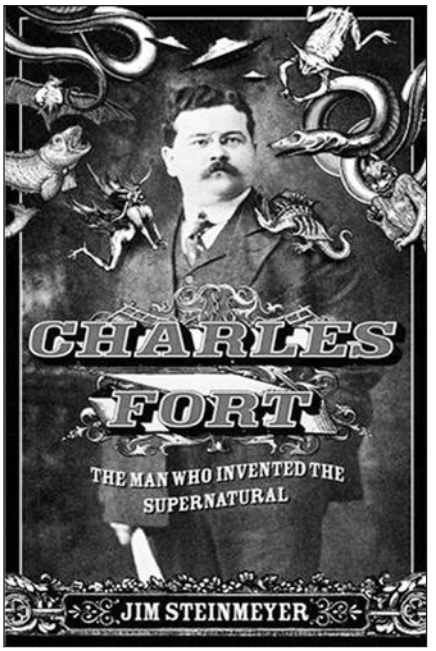
19. *Bigfoot Times*, October 20, 1992, page 21, and telephone conversations with Robert Lyle Laverty.

20. Gimlin says that in the night it began to rain. "Around 5:30 A.M. or so it started raining and it was just a pouring down rain. I told Roger we better get up and do something about the tracks or they'd wash out, and he said no, it would stop raining after a while. I went ahead and got up, put the saddle on my horse and decided I would ride up there while it was raining really hard and Roger says 'ah it'll quit, don't ride up there.' I said 'no I'm going to go ahead and ride on up there.' I had gotten a couple of cardboard boxes from Mr. Hodgson's to cover these tracks the night before. So when I went outside to get a couple of these boxes that were folded up out there, they were just soggy old pieces of cardboard. I disregarded [*sic*] taking those back up there—so I rode back up to the scene, pulled some bark off some trees and covered up the tracks as best I could and went back to camp." Is it possible that after spending the day making fake tracks showing unusual weight Gimlin wanted to protect his work? When I showed this quote to Anton Wroblewski, he commented: "Isn't it curious Gimlin uses the word 'scene' as if from a movie." □

Charles Fort's Life and Legacy of Strangeness

ROB BOSTON

Charles Fort: The Man Who Invented the Supernatural.
By Jim Steinmeyer. Tarcher-Penguin, 2008. 332 pp. Hardcover, $24.95.



Writer Charles Hoy Fort occupies an unusual position these days: respected and revered by advocates of the paranormal, scorned and dismissed by skeptics, and forgotten by everyone else.

Fort enjoyed cataloging unlikely events: showers of frogs and blood raining out of clear skies, mysterious "airships" drifting among the clouds, accounts of strange disappearances. In the early twentieth century, Fort penned a series of books that some argue is the work of a genius and others of a first-class crank.

Jim Steinmeyer's new biography of Fort, *Charles Fort: The Man Who Invented the Supernatural*, is a well-written, well-researched account of the life of a man whose name lives on in paranormal "Fortean societies" worldwide (groups Fort never supported, by the way). More than seventy years after his death, Fort still inspires admiration and imitation. His nonfiction works have never been out print.

Fort led an interesting life. He grew up under the thumb of an overbearing and abusive father, escaped to work briefly as a newspaper reporter at the tender age of fifteen, and traveled the world on a shoestring budget. Settling in New York City, Fort married and eked out a living supplying magazines with unusual short stories featuring O. Henry-esque twist endings. He eventually came to the attention of editor and novelist Theodore Dreiser, who admired Fort's stories and urged him to produce more. Prodded by Dreiser, Fort penned an odd, now forgotten novel called *The Outcast Manufacturers* before turning his hand to the world of the mysterious.

Fort wrote two paranormal-themed books titled *X* and *Y* before cranking out *Z*, later renamed *The Book of the Damned*. (He later destroyed the manuscripts for *X* and *Y*.) Dreiser was enthusiastic about the work and pressed his publisher to put it out, threatening to break with the firm when the editors balked.

The book sold poorly, but Dreiser used his influence to keep Fort going. Subsequent works, *Wild Talents, Lo!* and *New Lands*, gathered more attention, and Fort began to attract a following.

Steinmeyer draws heavily on fragments of Fort's unpublished autobiography and the voluminous correspondence between Fort and Dreiser to flesh out the story of this enigmatic figure. The portrait that surfaces is of a reclusive man poring over journals in a public library and cataloging musty clippings at home.

Fort was primarily a compiler. He published his material with little comment except to imply repeatedly that these odd tales had to mean something, daring scientists to explain them. He did no actual investigating himself.

Nevertheless, Fort clearly believed he was on to something big. Surviving descriptions of *X* and *Y* refer to unconventional theories—a type of floating sea in the sky that hurled down amphibians and blood, a solar system with planets much closer than they appear, a flourishing civilization at the South Pole.

Fort saw Mars as key to the puzzle. In Fort's day, the idea of Mars being inhabited was not considered so strange. He toyed with the idea that Martians were keeping Earth as a type of intergalactic petting zoo. One of Fort's best-known sayings is, "I think we're

Rob Boston is the assistant editor of Church and State *magazine, published by Americans United for Separation of Church and State in Washington, D.C. E-mail: boston@au.org.*

property."

Intrigued by these oddball theories, Dreiser continued to promote Fort to anyone who would listen. One Dreiser associate, the acerbic newspaper columnist H.L. Mencken, was not impressed. Fort, Mencken tried to explain to the novelist, was ignorant of basic science.

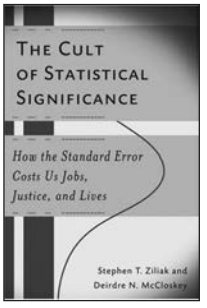
Dreiser had no better luck with H.G. Wells. After examining *The Book of the Damned*, Wells wrote to Dreiser and called Fort "one of the most damnable bores who ever cut scraps from out-of-the-way newspapers" who "writes like [a] drunkard." Dreiser sent back a long reply, defending his friend.

Forteans like to portray Fort as an early skeptic, but a more likely scenario is that he was gullible and/or simply ignorant of science. Fort rejected Newtonian physics and Darwinian evolution. In one of his books, he opined that a tale of a talking dog that said a few words before disappearing in a flash of green light was perhaps going too far—because of the green flash. Tales of talking animals had happily populated other Fort tomes.

Fort's smug attitude toward science and his self-congratulating prose indicate that he viewed himself as something of a prophet—but of what? As Steinmeyer points out in a nicely phrased passage, Fort produced a "canon of the supernatural," and his "four gospels" inspired writers like Charles Berlitz, Erich von Daniken, Ivan Sanderson, and others. That's a poor legacy indeed, but it's not Fort's only one. He has also inspired science-fiction writers, creators of graphic novels, and even authors of children's literature.

In the end, it is not necessary, as Steinmeyer implies in his conclusion, to grapple with whether Fort was a genius or a crank. The choice need not be so stark. Clearly Fort was no genius. He was not a researcher, never got near an actual lab, and did not study at a university. His speculations about the nature of our planet and the universe belong to the realm of early science fiction.

Yet it would be a mistake to dismiss Fort merely as a type of uber-crank who paved the way for the excesses of today's paranormal devotees, some of whom even Fort would likely agree go too far. The universe is probably not as strange as Fort believed it to be, but, for better or worse, many people have over the years been influenced by his insistence that it is. Long in his grave, Fort continues to force skeptics to respond to his



Statistically Significant Results Vs. Oomph

PETER LAMAL

The Cult of Statistical Significance: How the Standard Error Costs Us Jobs, Justice, and Lives. By Stephen T. Ziliak and Deirdre N. McCloskey. University of Michigan Press, Ann Arbor, 2008. ISBN: 13:978-0-472-05007-9. 320 pp. Paperback, $24.95.

A group of students taught by a particular teaching method is tested at the end of the school year. The average (mean) test score and the range of scores from lowest to highest are determined. This is an example of descriptive statistics. Using inferential statistics in another scenario: A group of students is taught by Method A and a second group by Method B. The test scores of both groups are analyzed and statistical procedures are used to determine if one of the groups scored statistically significantly better than the other group. In this example, the use of inferential statistics exemplifies the focus of Ziliak and McCloskey's strong criticism of one area of inferential statistics.

The authors of *The Cult of Statistical Significance*, who are quantitative economists, make it clear that they are not attacking statistics as such, which they value as a crucial tool. Their central point is that a particularly bad practice has reigned for more than eighty years that has consisted of reducing problems of testing, measurement, and interpretation of results to one of "statistical significance." This emphasis on statistical significance is a fundamental problem, because it diverts attention away from the proper objects of scientific study: scientific or practical (as opposed to statistical) significance, error analysis, and rational decision making. The erroneous emphasis on statistical significance has, the authors maintain, caused a loss of jobs, justice, profit, and human lives, and they provide examples in support of their assertion. A finding of statistical significance, or the lack of it, "is on its own almost valueless, a meaningless parlor game. Statistical significance should be a tiny part of an inquiry concerned with the size and importance of relationships" (2).

So just what is the problem that Ziliak and McCloskey are so concerned about? The problem, they say, is that tests of statistical significance do not answer quantitative, scientific questions. A test of statistical significance is not a scientific test; rather it is a philosophical, qualitative test. It asks *whether* some relationship exists; it does not, however, ask *to what degree* it exists. The social sciences ask, for example, whether there exists an effect of drug prices on addiction or whether there exists an effect of Vioxx on heart attacks. An effect does or does not exist, say the practitioners of statistical significance. But if an effect is found, they fail to ask the question "How big is the effect?" They fail to consider the pragmatic questions: "What difference does the effect make? Who cares about the effect?"

Peter Lamal is an emeritus professor of psychology at the University of North Carolina at Charlotte and a fellow of the Division of Behavior Analysis of the American Psychological Association. E-mail: plamal@carolina.rr.com.

In the 1920s and 1930s, R.A. Fisher, one of the most renowned statisticians of the twentieth century, developed the subdiscipline of statistical significance testing and attracted a number of influential disciples. Fisher's word is extremely influential to this day. The authors' hero, in contrast to their dim view of Fisher, is the neglected William Gosset (1876–1937), who unlike Fisher asked the right question: what is the *substantive* significance of a statistical result?

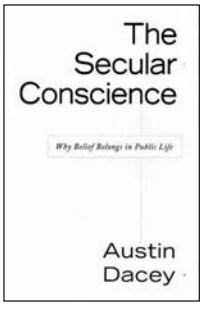
Statistical significance testing misguidedly involves choosing precision over practical considerations, the latter being "oomph" in the authors' lexicon. This is illustrated by an example of two weight-loss pills of differing average effect. How to choose between them? The effect of one of the pills is much less variable (more precise) than the effect of the other, but the other can, although not necessarily, result in much greater weight loss. The latter pill has "oomph" and is the one to choose.

In addition to lack of oomph, testing for statistical significance involves the fallacy of the transposed conditional. That is, if a certain hypothesis (e.g., teaching method A is superior to method B) is followed by a certain observation (students taught by A perform better than those taught by B), this particular finding does not warrant the conclusion that other better-performing students have necessarily been taught by method A. "If H, then O" does not affirm "If O, then H." Ziliak and McCloskey illustrate the fallacy by saying that if a person is hanged he will probably die. On encountering a corpse under a sheet, statisticians subject to the transposed conditional fallacy would thus say, "He was probably hanged." Since Fisher's work in the 1920s, the fallacy has had a pernicious effect on the work of many economic, medical, psychological, and forensic scientists.

The persistence in economics over decades of the focus on statistical significance versus oomph is the result of teachers and textbooks emphasizing the importance of the former. In many textbooks, practical significance is not even mentioned. But in sociology, psychology, and educational research, many researchers have considered the difference between oomph and statistical significance. But "psychologists have known about the difference for many decades, although like economists, most of them continue to ignore it" (111). It should be pointed out, however, that behavior analysts, at least since B.F. Skinner (*Science and Human Behavior*, 1953), have not been captivated by statistical significance testing, focusing instead on demonstrating substantive, pragmatic significance.

For the general reader, Ziliak and McCloskey recommend the first three of the twenty-four chapters of this book. The reader will understand the main point that oomph—the difference a treatment makes—is much more important than statistical significance testing. For the remainder of the book, they assume the reader is familiar with testing, estimation, and error statistics as used in the life and human sciences.

Ziliak and McCloskey have persisted in their praiseworthy endeavor for many years. It would be extremely gratifying to see them succeed—think of the increase in oomph in the social and medical sciences that would generate.



Secular Sunshine as the Best Disinfectant

KENNETH W. KRAUSE

The Secular Conscience: Why Belief Belongs in Public Life. Austin Dacey. Prometheus Books: Amherst, New York, 2008. ISBN: 978-1-59102-604-4. 240 pp. Hardcover, $24.95.

In America, self-anointed "values voters" receive an intellectual pass every election year. Rarely, if ever, are alternately furious or teary-eyed "pro-lifers" asked to publicly and rationally defend their bald claims that nonfeeling, nonsentient fetuses and, in some cases, even 150-cell blastocysts possess rights superior to those of hopeful billions who are conscious of themselves and their world and, in fact, can sense the pain and despair with which all people should be able to empathize.

Surely, secularists must realize that in a wild, standard-free struggle between emotionally charged sound bites, "pro-choice" can never triumph over "pro-life." Indeed, were the issues that uncomplicated, it should not. But the technical and societal details of these matters easily favor both legal abortion and, despite recent scientific advances, generous public support for embryonic stem cell research. So why do most secularists refuse to argue the salient facts to the common American voter?

Throughout the world, Islamist terrorists issue death sentences to authors and apostates, support so-called "honor-killings," and bomb innocent civilians to fulfill their perceived duties to God. Although secular world leaders and news organizations rightly condemn the perpetrators as individual fanatics, they seldom dare to so much as question the religious motivations behind such fanaticism. Instead, Islam is ever so diplomatically dubbed "a religion of peace." Why not at least acknowledge the apparent correlations between religious conviction and senseless violence?

Because secularism has "lost its soul," replies Austin Dacey, professor of human-

Kenneth W. Krause is contributing science editor for the Humanist, *books editor for* Secular Nation, *and frequently contributes to* SKEPTICAL INQUIRER. *He may be contacted at krausekc@msn.com.*

ities and United Nations representative for the Center for Inquiry/Transnational. Although the American model of secular government was premised on open and vigorous competition between numerous philosophies and religious sects in the free marketplace of moral visions, American citizens of all persuasions have since deeply internalized at least two logical fallacies that prevent them from achieving that ideal.

The Privacy Fallacy, Dacey instructs, decrees that all matters of conscience—secular or religious—are utterly personal and, hence, forbidden subjects for public discourse. So long as beliefs are not "imposed" on others, this hopelessly regressive mantra goes, every person has a "right" to believe as she will without interference of any kind. Enter the Liberty Fallacy, which mistakenly concludes that because conscience must not be coerced, it is equally immune to reasoned critique and objective intellectual and moral standards.

But unlimited deference to others' beliefs does not constitute *respect* for those beliefs but rather a blind, blanket acceptance of or careless indifference to them. Respect for truth and decency, by contrast, necessarily entails serious consideration, scrutiny, and when appropriate, direct public criticism. The architects of secular liberalism would scarcely recognize their descendants today, because they would never have tolerated, much less recommended, political neutrality regarding matters of conscience. Dacey draws heavily from the skeptical and utilitarian writings of Baruch Spinoza and John Stuart Mill to prove his point.

Perhaps most instructive for the author, however, is ethicist Adam Smith's 1759 *Theory of Moral Sentiments*, which appealed to every man's "impartial and well-informed spectator" as "the great judge and arbiter of their conduct." The moral point of view, according to Smith, is anything but subjective. Rather, it transcends the individual and is, at least in theory, accessible to every citizen. In the larger societal context, Dacey concurs, accessibility necessarily depends on a permissive public attitude. Freedom of conscience, in other words, is inherently social and must include the liberty to speak publicly as one's conscience compels.

So, if secularists are committed to morality's rational foundation, they shouldn't object to open political religious expression on any grounds, much less on the basis of personal autonomy or subjectivity. In so doing, they would forfeit precious opportunities to confront religious extremism and expose it as the institutionalized fear and bigotry that it plainly is.

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Nor should religious speech be barred for its proven divisiveness. All moral questions are intrinsically provocative. If secularists wish to publicly reclaim the ethical high ground, they ought not to exclude certain ideas arbitrarily.

Religion must be freed from its rhetorical and ideological closets before it can be fully exposed to the light of reason. For perhaps the first time in history, faith must be held to the same practical standards routinely applied to other claims of fact and conscience. For Dacey, these include honesty, rationality, consistency, evidence, feasibility, legality, morality, and revisability. Although the author admits there can exist no concrete and all-encompassing Theory of Everyone (which the Golden Rule and Kant's Categorical Imperatives attempt but fail to accomplish), he insists that ethical objectivity and universality can nonetheless be achieved with a method—a shared language of public examination.

Even if we can't assent to a sufficient number of values and principles, we should be able to agree on the means by which we converse about and distinguish them. Such, in general terms, is the objective, transparent, and merit-based method of science. When all beliefs are liberated for (but not from) inspection, Dacey concludes, they will necessarily be forced to stand trial in the common and supreme court of reason.

Dacey's philosophy, as such, is hopeful and theoretically sound. The problem is that from the philosopher's ivory tower the cruel and cluttered scientific facts—especially those describing the ordinary person's evolved psychology and tribal character—are nearly imperceptible. What the author fails to recognize, or at least to account for, is that both reason and morality have always taken a distant backseat—not so much to religion specifically—but to humanity's innate tendency to fracture into mutually sanctimonious and ultimately antagonistic in- and out-groups. Nature has never selected for completely independent, much less impartial, human spectators.

Religion continues to hold popular sway, in other words, not merely because people don't know that other options exist—although that might be true in many unfortunate cases—but rather because group constituents *don't really care to know* about other groups' ways of life. Secularists can invite anti-intellectuals to a candid, open, and rational debate until their tongues seize, but rarely will they succeed in extricating a person from the tribe with which she has long enjoyed comfort, safety, and reinforcement. Arguably, Dacey assumes too much of people too quickly.

That said, maybe it's worth a shot anyway. Secularists have much or very little to lose, depending on one's perspective, but any argument calling for a more sincere and inclusive discussion can't be all that bad. And certainly Dacey is correct that once achieved, an empirico-rational moral system would prove far superior to one based on religious dogma (he notes, for example, that although secular Americans are significantly less likely to give to the poor than their religious counterparts, the

second most generous nation, Denmark, also claims one of the lowest rates of church attendance and, not so incidentally, the highest rate of self-reported life fulfillment).

People do change at both the individual and species levels, if ever so methodically. A new Pew Forum survey of the American religious landscape reveals that 28 percent of adults have fled their childhood faith to another religion or to no religion whatsoever, that Protestants now comprise only 51 percent of the population compared to two-thirds in 1980, and that 16.1 percent of Americans are not religiously affiliated—twice the rate as when they were children. One can only hope, of course, that these apostates have managed to supplant religion with something much better.

Regardless, perhaps Dacey's secularism can reclaim its common democratic sense and, thus, its soul. And given ample time, or alternatively an emergent mass rebellion against humanity's selfish genes and memes, maybe secularists can achieve their ultimate goal of cultivating among all persons a truly thoughtful, empathetic, and responsive secular conscience. □

LOVE AT FIRST SIGHT
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whose faces have been shown to resemble not only their own faces but also the faces of their parents of the opposite sex, especially when it comes to hair color and eye color (Bereczkei, et al. 2002; Little, et al. 2003). The age of our parents also seems to influence our choice of mate, with females born to older parents being attracted to the faces of older men and males born to older parents being drawn to the faces of older women (Perrett, et al. 2002). Furthermore, daughters who were adopted between two and eight years old or who rated their childhood relationships with their fathers highly chose husbands whose faces looked like those of the fathers who raised them (Bereczkei, et al. 2004; and Wiszewska, et al. 2007).

Thus, it's entirely possible that the person who made the most lasting visual impression on you when you were a young child or infant—a parent, a sibling, or even a nanny—unknowingly drew the mental roadmap to your romantic future. Your search for Mr. or Mrs. Right might simply be an exercise, albeit a risky one, in suggestion.

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More Cool Careers for Dummies: Ghost Hunter

PAUL DESORMEAUX

While searching for jobs during these challenging economic times, the general type of question job seekers ask is "How am I going to fill my gas tank on a %$#%@ telemarketer's salary?" If you're someone who thinks outside the cubicle, though, it's only a matter of time before you begin exploring a variety of lucrative and cutting-edge career choices, such as crop-circle designer, cult leader, or fortune-cookie writer. May I also suggest printing up a stack of Ghost Hunter business cards?

What are the job prospects for a ghost hunter in this day and age? Since about one-third of the U.S. population believes in things that go bump in the night and one-quarter believes, they've come face-to-plasm with an apparition, you can bet your sweet poltergeist that ghost busters will be in demand for years to come—especially if the ghost population continues increasing because of human beings' persistent habit of dying.

As for educational requirements, whether you're a college graduate, a couple of plumbers, or occasionally forget to breathe, you're

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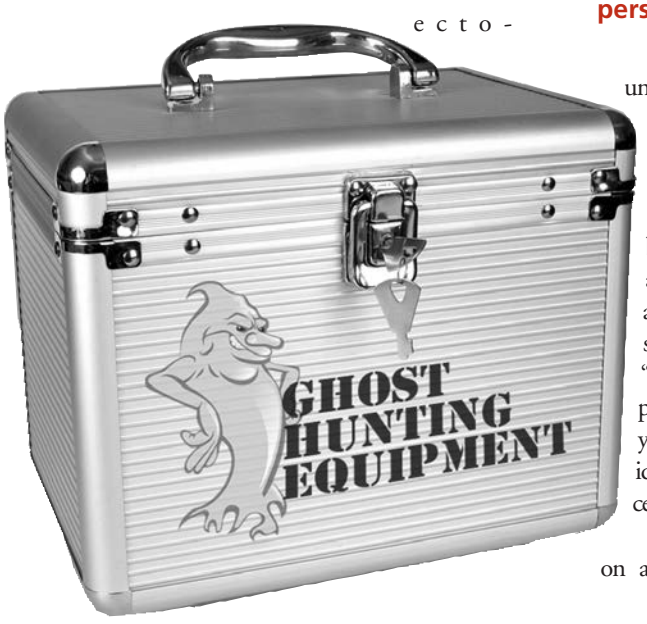

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uniquely qualified to hunt spiritual thingamajigs. If, however, you think you might be more marketable if you can wave credentials under a potential client's nose, by all means look into credits and certificates you can earn from a number of reputable sources, such as online courses, Manila's "diploma" mill, or your computer print-er. With minimum effort on your part, you won't be just any idiot hunting for ghosts; you'll be a certified one.

When you eventually decide on a career in hunting spirits, you will need the basic equipment listed below. Luckily, ghost-finding starter kits are fairly inexpensive and will cost you no more than, say, a month's worth of "donations" to the sperm bank. Once you're established as a genuine, professional ghost chaser, you'll be able to add more expensive and sophisticated tools to your arsenal, e.g., the Ectomobile S3000 and a psychic on retainer.

Basic Ghost Hunting Equipment

Notebook and pencil Use these essential utensils to write down any abnormal observations, impressions of strange appearances and noises, and while you're endlessly waiting for an actual paranormal event, a list of euphemisms for female breasts.

Flashlight Wave this handy item around a haunted house and those boundless,

bizarre reflections will surely be interpreted as ethereal events. Alternatively, you'll snap pictures a-plenty when it's used to create spooky hand shadows.

Dowsing rod These must have ghost la-

Paul DesOrmeaux wrote "Cool Careers for Dummies: Psychic Detective" in our March/April 2008 issue. He oversees the Rochesterville Skeptics Club in Central New York. Email: skepticalfunhouse@gmail.com.

cators—which are traditionally used to find water—consist of two L-shaped rods of specialized light metal, such as brass, copper, or coat hanger. By holding one rod lightly in each hand and pointing them away from your body, they will cross, rise, or dip when encountering a ghost's energy field or urine puddle.

Digital camera Although any camera will

do, a digital camera is especially effective at photographing ghost "orbs." Medically speaking, these ghostettes, or "balls of light," are thought to be early ghost embryos.

Digital video camera Video affirmation of ghosts is always more impressive than still shots, e.g., close-up, out-of-focus images of Boo Berry cereal floating in milk.

EMF detector This invaluable piece of equipment measures electromagnetic radiation and is used to detect a ghost's energy field. Any positive reading inside a haunted house could be a clear sign of a ghost, spirit, or toaster oven.

Digital audio recorder (DAR) Although you might think ghosts go quietly about their business, they actually knock items off walls, levitate objects, and are able to verbalize without vocal chords (known as Electronic Voice Phenomena). DARs can provide clear evidence of ghost vocalizations, such as "boo," "whooo," and "If thou didst ever thy father love, revenge his foul and most unnatural murder."

Infrared thermometer Because ghosts absorb ambient energy, they will be warmer than the air around them, which this thermometer will record. Any ten-degree change can indicate the presence of a ghost or, more likely, flatulence.

Ghost Hunting Rules

Follow these simple rules and, who knows, before long you may be hosting your own ghost-hunting podcast.

Bring extra batteries. Ghosts or spirits need energy to materialize, so they will sap the energy from the batteries in your electronic equipment, your car, and your electronic propeller beanie.

Before taking digital pictures, never clean the lens. Dust particles, insects, and smudges left on the lens will guarantee clear evidence of "spiritual irregularities."

Smoke cigarettes. While puffing away, keep your camera clicking. Where there's smoke, there are billowy, swirly, cancer-causing ghosts.

Always bring along a buddy. It's good legal practice to have a witness available if a phantom accuses you of spiritual harassment.

Drink alcoholic beverages, ingest drugs. Overactive imaginations increase the chances of reporting apparitional phenomena.

Gather information before investigating a haunted house. When getting started, favor houses where the deceased was obese. It's only logical that it's easier to spot fat ghosts.

Get the property owner's permission before entering a haunted house. Otherwise she may mistake you for an intruder. In our gun-loving culture, many a trigger-happy, haunted-house owner has magically converted a ghost "hunter" into a ghost "hunted."

Be respectful. In all likelihood, ghosts are probably angry that you're living and they're not. So when you converse with them, be diplomatic. If they're confrontational, stay positive. "Would you like a hot cup of ions" is more appropriate than "Go suck on a battery."

Ask the spirits plenty of questions. However, don't expect an immediate EVP, since it's obvious they lack a primary auditory cortex. As an alternative, keep the recording device running, ask your questions, and leave for awhile. When you return, at the very least you'll pick up mysterious sounds of footsteps retreating from and then approaching the recorder.

So, if you can arm yourself with the proper ghost-hunting equipment, if you've studied and follow the basic spirit-finding rules, and if you have a tendency to see human-like images in sweat stains or bowls of chili, an exciting, recession-proof, ghost-hunting career is just an illusion or two away. □

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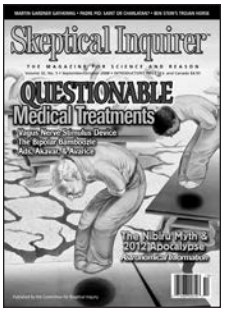

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JULY/AUGUST 2005 (vol. 29, no. 4): Carl Sagan takes questions / The great turning away, *Druyan* / How do you solve a problem like a (Fritjof) Capra?, *Guttman* / Fakers and innocents, *Randi* / What should we do with skepticism?, *Borgo* / Special report: Voodoo science and voodoo politics in Florida, *Martinez* / The case of the 'psychic detectives,' *Nickell*.

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MARCH/APRIL 2005 (vol. 29, no. 2): One longsome argument, *Trumble* / Moonshine: Why the peppered moth remains an icon of evolution, *Young and Musgrave* / Hyperbole in media reports on asteroids and impacts, *Morrison* / Ringing false alarms: Skepticism and media scares, *Radford* / The glaring garret ghost, *Durm* / Scientists and the election, *Estling* / Comforting thoughts about death that have nothing to do with God, *Christina* / Intuition: The case of the unknown daughter, *Nickell*.

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Ghosts and Ion Counters

DON A. MERRELL

On a recent Friday night on the Travel Channel, the ghost hunters on the show *Most Haunted* were seeking specters in a creepy Welsh mansion. Though the hunters were finding no ghosts with their cameras, their ion counter was registering a marked change in positive and negative ions—apparently produced by a ghost in the room. The ion counter, it seems, has become (along with the electromagnetic field/EMF detector) the tool of choice for the sophisticated ghost hunter. Unfortunately, even if ghosts exist, we could not know that the ion counter is registering their existence. To see why, let's examine the fish-finder.

Fish-finders are useful devices allowing one to see a picture of the underwater environment, thereby giving the angler the advantage of wasting no time blindly tossing line into fishless water. How do we know that fish-finders are reliable for finding fish? I'm assuming that something like the following is the answer: at the fish-finder factory there is a large tank filled with water. In this tank we find various immersed items—logs, beer cans, rocks, bicycles, etc.—and, of course, we need some actual fish in there too. To test the fish-finder, the technician turns the fish-finder on and allows it to scan the tank. If the fish-finder finds the fish, it will distinguish them from all nonfish objects in the tank. It usually does so by representing all of this on a small digital screen. And what is essential here is that the technicians can independently verify that the fish-finder is finding fish, which is easy to do since those who set up the experiment already *know* how many fish are in the tank, where they are, and where all the nonfish are. (You don't want the fish-finder to misrepresent nonfish as fish. That's why we need to already know the location of all the nonfish.)

The fish-finder offers a paradigm for locating objects not readily seen by the naked eye. If so, then why in the world would we think that the ion counter is able to locate ghosts? To be minimally confident that the ion counter is reliable at locating ghosts, wouldn't we at least have to already know that ghosts exist, where they are located, and how much ionic change they can achieve? How could one go about testing the reliability of the ion counter as a ghost detector? If the fish-finder analogy is apt, something like the following would have to be the case: we'd have several large rooms, each filled either with ghosts or nonghosts (some actual people, some mannequins, a sofa, a coat tree, etc.) and then we'd turn the ion counter on and let it read each room. We'd know that the ion counter is a reliable ghost detector if we see that it accurately represents a marked change in ions where the ghosts are but not where the nonghosts are—in the same way that the fish-finder displays fish on the screen only when fish are present.

But doesn't this mean that we need independent and overwhelming evidence—visual or auditory—for ghosts? I assume that if one did find overwhelming evidence, it would be sufficient to refute the skeptics. Why haven't we seen all this evidence? Surely this evidence exists if all these ghost hunters are confident that their ion counters are reliable ghost detectors. Since we haven't seen this evidence, we must conclude that there is no reason to suspect that ion counters are reliable ghost detectors. □

Don Merrell is visiting assistant professor of philosophy at Arkansas State University.

A Mind for Murdergate

"Psychic clues" audaciously altered in new edition of Renier memoir

GARY P. POSNER

In the opening paragraph of my September/October 2005 review of "psychic detective" Noreen Renier's memoir, *A Mind for Murder* (published in paperback by Berkley Books, a division of Penguin), I complimented the book as "an entertaining adventure . . . and the writing isn't half-bad." I then added, "But are the author's 'psychic' claims even half-true?" Much of the remainder of the review offered my reasons for being highly skeptical of the book's veracity.

Reissued earlier this year by a new publisher, at first glance this "Expanded, Revised, and Updated Edition" appears essentially the same as the original, save for a larger format and two chapters being replaced with two new ones (on the Laci Peterson case and another in Montana). However, closer inspection reveals a number of small changes, including one so audacious it defies any innocent explanation imaginable.

The two jettisoned chapters focused upon Renier's legal battles with skeptic John Merrell, whom she sued for libel in 1986 for having accused her of "fraudulent activities." As I reported in a July/August 2007 "News and Comment" item, these chapters violated Renier's 1992 settlement agreement with Merrell and prompted Berkley/Penguin (which Merrell sued along with Renier, her co-author, and her editor) to withdraw the book. Per that 1992 agreement, neither Renier nor Merrell was permitted to again publicly disparage the other.

Resurrected this past April by Hampton Roads Publishing of Charlottesville, Virginia (Renier's hometown, to which she returned in 2004 after residing for nearly two decades in Florida), the book's cover contains a new tagline proclaiming Renier as "Court TV's Psychic Detective," which she certainly had been until the first of this year, when Court TV revamped itself into truTV and *Psychic Detectives* vanished from its Web site's program listings (the series reemerged recently with new episodes, and time will tell if Renier remains a featured attraction).

Mysteriously missing from the new cover is the name of Renier's co-author, Naomi Lucks, which had originally been nearly as prominent as Renier's. I suspect that Lucks's professional craftsmanship is largely responsible for the book's redeeming stylistic flair. The "Acknowledgments" also no longer mention Lucks or the authors' original editor. The book is nothing close to a rewrite, so why would they no longer merit Renier's appreciation? A much more likely explanation is that, having been kept in the dark by Renier about her binding agreement not to trash Merrell in print and thus blindsided by his lawsuit, they wished to have nothing more to do with the book.

But unexpurgated from the "Acknowledgments" is a brief paragraph, no doubt confounding to most readers, thanking "my attorney . . . who tried my [1986] libel case against the skeptic," even though no mention remains anywhere else in the book about the case or the skeptic (Merrell). It is with mixed feelings that I realized Renier's critical mention of yours truly had also been in one of the two purged chapters.

This new edition presented Renier with an opportunity to correct any known factual errors that had inadvertently found their way into the first printing, and I've counted about fifteen or so minor corrections—or at least changes. A few examples: an instance of "psychologist" was changed to "parapsychologist," "Cindy" (a murder victim) to "Sally," "Burrville" Police Department to "Hampton," "Dennis" (a police sketch artist) to "Mike."

But then there's the one "correction" that stands out among all others—at least to the handful of people who know the case intimately and have compared the two accounts microscopically. In his historic series of interviews with disgraced American ex-president Richard Nixon, David Frost cajoled Nixon into acknowledging that he had provided his detractors ammunition with his Watergate-related conduct (including the doctoring of transcripts): "I gave them a sword, and they stuck it in and they twisted it with relish." Chapter 16 of

Gary Posner, MD, is founder of Tampa Bay Skeptics and a CSI scientific consultant. His extensive writings on Noreen Renier can be found at http://members.aol.com/garypos/Renier_list.html.

Noreen Renier's reissued memoir contains such a sword.

That chapter discusses the case of a small airplane that disappeared in northern Massachusetts in January 1984. One of the four passengers, Arthur Herbert, was the brother of the ex-wife of an FBI agent, and both his sister and the agent offered sworn testimony on Renier's behalf during her 1986 libel trial against John Merrell, crediting Renier with providing clues instrumental in locating the wreckage, though the brother was found dead along with the others.

In chapter 16 of the new edition, while reciting the series of clues that she had offered the then-missing man's sister (on page 146), Renier says:

> I saw two sets of numbers. Breathlessly, I repeated them to my client [Arthur Herbert's sister, Jessica]. I could feel they were important.
>
> Now letters came into my head. "I see three letters," I said. "G, T, and O . . . they are significant . . . they could be initials of towns . . . they definitely have something to do with the location of the missing airplane." *(Spelling, punctuation, and ellipses are verbatim.)*

Two pages later, in discussing the aftermath:

> [T]he numbers I had given Jessica turned out to be longitude and latitude of the downed plane. And the letters? They were the initial letters of the names of two towns, Gardner and Templeton, whose outskirts connected in the area marked by the longitude and latitude. The "O" turned out to be the first letter of the name of the river that runs right next to the crash site.

Renier then goes on to say that the wreckage was ultimately located by Carl and Cheryl Wilber, a father and daughter who were following deer tracks through the snowy, dense woods. She further described the nature of the terrain as rocky with "towering hills" and "big gorges." Renier says that the Wilbers "couldn't help [but] notice the [search] planes that had been circling overhead," implying that her numerical and alphabetical clues had pinpointed a precise tract in the Gardner-Templeton area, along a particular river, resulting in the Wilbers' decision to search there.

No wonder Renier enjoys a reputation, perhaps second only to Sylvia Browne's, as a world-renowned "psychic detective." But buried among the dirty linen in the laundry list of problems associated with Renier's telling of the story is the Nixonesque sword. From page 188 of the *first edition's* chapter 16:

> Now letters came into my head. "I see three letters," I said. "H, D, and A . . . They are significant. . . . They could be initials of towns. . . . They definitely have something to do with the location of the missing airplane." *(Punctuation and ellipses are again verbatim.)*

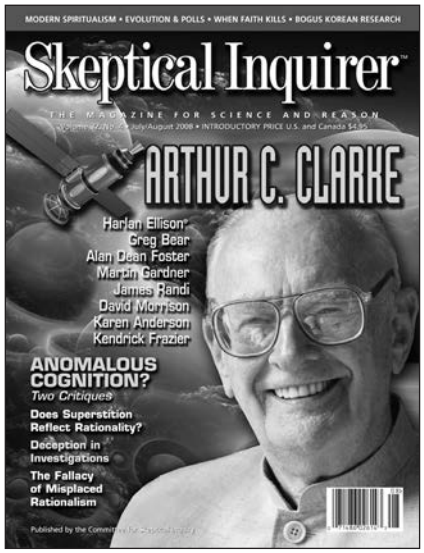
And what towns and/or river did *those* clues—presumably the *actual* ones she had provided—point toward? Renier didn't specify, saying simply, "They were the initial letters of the names of three towns whose outskirts all connected in the area marked by the longitude and latitude." Not three towns associated with *this* crash! But John Merrell has an idea where "H, D, and A" may have come from—he suspects Renier may have made the same "nonpsychic" mistake I did!

When presenting this case in my chapter on Renier in *Psychic Sleuths* (Prometheus Books, 1994), one of the news clippings that I referenced (about an onboard "fire") actually pertained to one of two *other* small-plane crashes that occurred within a thirty-mile radius in the same general time frame as the "G, T, and O" crash. As Merrell explains on his Web site devoted to the book (www.amindformurder.com), "If one examines a map of the area you can draw a virtually straight line from east to west from Hubbardston to Dana Center to Amherst for the Barre crash. . . . And for the crash near the Monadnock area there is the Ashuelot River, Dublin and Hadley." He also notes that, unlike *this* case's crash site, "Both of [the others] were near mountainous terrain, rock slabs, and gorges," matching Renier's description.

Even if her clues actually *had* been "G, T, and O," would they have mattered? As reported in the press, the troubled plane was witnessed going down about a half-mile from the Gardner airport nearly two weeks earlier, and the Wilbers set out in that direction for that reason alone. They never saw any circling search planes, and only in 2006, when Merrell tracked them down for an interview, did the pair first hear of Renier and her claims. Upon reading her version of events (including her "psychic" visions of various nearby landmarks, the rocky, gorge-filled terrain with "towering hills," the Wilbers' reason for searching where they did, etc.), Carl Wilber told Merrell, "I don't think she got *anything* right." Said Cheryl, "It makes me feel terrible that somebody took advantage of the situation. . . . She made up a lot of stuff."

Here's something else that Renier made up—though Jessica Herbert seemed to believe it when she offered it at deposition before the libel trial: "Noreen said that [my brother] had survived, the girl had survived . . . and that he had taken her out of the plane, set her in a safe place and gone for help. [She also] described how he had tried to get down the side of the big hill and sat down because of the broken leg." According to Merrell, in conjunction with Renier's own dramatic courtroom testimony, Herbert's rendition of this selfless act of heroism, when read into evidence during the trial, brought two of the jurors to tears. Yet the scenario is sheer fantasy. The NTSB had determined that all four occupants died immediately upon impact, and the woman's decapitated body couldn't even be removed until the mangled metal was cut apart.

There had already been myriad reasons, as I and other critics have extensively documented, for taking such "psychic" claims with a gargantuan grain of salt. But the newly revealed Watergate-worthy doctoring of "H, D, and A" to "G, T, and O" in this case—one of the most famous and vouched for in Noreen Renier's storied career—should resign her to the fact that she has handed the world a sword that has unequivocally and forevermore impeached her credibility. Anyone care for relish? □



Anomalous Cognition: Replicable Effects?

In describing a scientific meeting on anomalous cognition ("Anomalous Cognition? A Second Perspective," SI, July/August 2008), Ray Hyman writes that "a psi proponent reported a meta-analysis of [telepathy experiments] with an average effect size that significantly differed from zero with odds of more than a trillion to one while another meta-analysis . . . concluded that the average effect size was consistent with zero."

The latter refers to a publication by Milton and Wiseman (1999), which analyzed only a small subset of available experiments and based its conclusion on a method that underestimated the true effect. When using the same (simpler and more powerful) technique as other meta-analyses, their result was significantly positive (Radin 2006, 118). In addition, when skeptical psychologists recently attempted to repeat these same experiments, to their chagrin they too obtained a significantly positive outcome (Delgado-Romero and Howard 2005).

Considering all available evidence, including many other experiments presented at the cited meeting, it is clear that some anomalous cognition phenomena have been successfully and independently repeated.

Dean Radin
Senior Scientist
Institute of Noetic Sciences
Petaluma, California

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Ray Hyman replies:

Dean Radin questions the import of a quotation that he attributes to me (actually the statement was made by Amir Raz in his article that accompanies mine). Amir Raz was illustrating the lack of robustness in the parapsychological literature. Two meta-analyses conducted on the same body of literature at approximately the same time came to radically different conclusions. Radin attributes this inconsistency to weaknesses in the Milton and Wiseman meta-analysis. The implication is that his own meta-analysis, which he claims yielded a highly significant effect size, was relatively free of weaknesses. Milton and Wiseman asked if the Ganzfeld effect was replicable. They correctly realized that replicability is a prospective, rather than a retrospective, idea. This means that a replicable effect is one that we can expect to obtain, given adequate power, in future experiments. To see if the Ganzfeld results were replicable, they included only those studies that had been conducted after *those which constituted the database that served as the basis for the dispute between Honorton and me.*

Radin's meta-analysis included the original Ganzfeld database as well as the later studies. Such a meta-analysis does not speak to the replicability of the Ganzfeld effect, since it includes the data whose repeatability is in question! Radin also faults the Milton-Wiseman study for not "using the same (simpler and more powerful) technique as other meta-analyses. . . ." The other meta-analyses may be using a simpler and more powerful technique, but it is one that illegitimately inflates the significance level because it ignores, among other things, the heterogeneity among the studies in each meta-analysis.

However, the question about whether meta-analysis is an appropriate way to evaluate the replicability of parapsychology experiments is moot given the points I made in my article. When effect sizes are plotted against the date of the research study, the regression lines decline to zero in the Ganzfeld experiments as well as other major research programs in parapsychology. This hardly supports a claim of replicability. In more direct attempts to obtain predictable results, even where the power is adequate, the outcome is failure. Finally, Radin still has not explained how his claim that evidence for psi is replicable can be reconciled with the admissions by other major parapsychologists that psi effects cannot be replicated according to scientific standards.

Puh-leaaase. I'm sick and tired of namby-pamby skeptics kowtowing to the forces of irrationalism.

Amir Raz writes ("Anomalous Cognition: A Meeting of Minds, SI, July/August 2008): "Based on insufficient evidence we cannot decisively conclude that the Tooth Fairy does not exist." I'm sorry, but I do know (full and plenty well) that the Tooth Fairy exists solely as an element of imagination, perhaps in dolls and drawings, etc., but not otherwise. Okay, I don't "know" this in any silly transcendent sense, but there is very little I do know in such a sense. As a practical matter, none of my working knowledge about the world is in any manner transcendent. It's all inductive, and my knowledge about the Tooth Fairy's existence, or nonexistence, is on no lower plane than my knowledge that Earth is (roughly) spherical and orbits the sun.

Why are so many skeptics so unreasonably skeptical about "negative" knowledge (i.e., a reasonably strong sense of certainty that some imagined object does not extend beyond the imagination)?

It's clear what is happening. A large number of people want to believe in things for which there is no reasonable evidence and scads of counterevidence. Too many skeptics are too sympathetic and grant passes in circumstances where otherwise there'd be no respect or deference. Ultimately, it's very counterproductive.

It's fully possible, on the one hand, to grant that a person sincerely believes in some delusion, finds it supra-meaningful, and is (even) totally convinced of its reasoned veracity. It is simultaneously consistent, on the other hand, to refrain from falsely sympathizing (much less joining in) with the delusionary methods a believer deploys.

Just to be clear, I am not claiming that any of our knowledge is infallible. We might indeed find we've been mistaken about Earth orbiting the sun. Every true skeptic acknowledges that. But simultaneously, we acknowledge that any hope for that prospect (at least while respecting the state of evidence as it exists today) would be the height of silliness.

I submit that the entire MoM enterprise (as described by Raz) was similarly silly, and as skeptics we should refrain from taking stances that seem to imbue such objects with even apparent dignity.

Glade Ross

Shelton, Washington

CFI Conference Coverage and Conditions in China

The SKEPTICAL INQUIRER (March/April 2008) devoted two articles by Kendrick Frazier and myself to describing the recent conference held in Beijing as a culmination of twenty years of cordial exchange programs between the Chinese Association for Science and Technology (similar to the American Association for the Advancement of Science) and the Center for Inquiry (including the Committee for Skeptical Inquiry).

This exchange program is primarily scientific and educational. It is concerned with the problem of conveying to the public an understanding of science, including criticisms of claims of the paranormal and superstition. CFI/Transnational brought several distinguished speakers from five countries, and it was generally agreed that we all profited from the experience.

Jeffrey T. Richardson criticizes me (SI, Letters, July/August 2008) for not being sufficiently skeptical of the Chinese government (its policies in Tibet, North Korea, and Sudan, and its abuse of human rights). This was a scientific, not a political, conference. We also did not deal with the policies of the U.S. government (in Iraq, Afghanistan, or Guantanamo Bay) or the policies of the British or French governments.

I tried to point out in my article that it is useful to engage in dialogues, and we found the discussions of "science and the public" extremely interesting. Given the facts of global interdependence, thousands of companies, universities, institutes, and associations have sent emissaries to China and vice versa and have engaged in commerce and exchange with mutual benefit. It was helpful for CFI and CSI to have done so as well, particularly since the Chinese place such a high value on science and technology. Of course, I do not agree with the abuse of human rights in China, and I have in my writings consistently defended human rights and democracy. I sought to point out that the Chinese regime is more authoritarian than totalitarian (there is a difference), and that we should avoid, if we can, the partisan controversies of the Cold War.

Indeed, China has a mixed economy far more committed to a market economy than to communism or socialism. I hope that we can engage in such exchange programs without rancor. Many of the Chinese scientists and educators at the conference praised human rights, democracy, and humanism, but whether and to what extent they will be implemented is the great issue of our time.

Barry Seidman, on the other hand, indicts me for pointing out the grave problems that China faces because of the vast disparity in income between the new class of entrepreneurs and billionaires and the widespread poverty among a large sector of the population (and I might also mention the grave problem of environmental pollution), and the fact that I applauded its free market for its contributions to economic growth. I do not think that the terms "capitalism" or "communism" are easily applicable to China today; for it has a mixed economy and in this sense is somewhat similar to economies of Europe. Clearly, China faces awesome problems. I do not think that ideological name calling advances our understanding of what is going on or contributes to fruitful dialogue.

Paul Kurtz
Chairman, Center for Inquiry
Chairman, Committee for Skeptical Inquiry
Amherst, New York

Superstition and Rationality

I'd like to address some issues raised by Konrad Talmont-Kaminski in his article "In a Mirror, Darkly: Does Superstition Reflect Reality?" (SI, July/August 2008). In determining the potential rationality of superstitions, one might consider the placebo. John E. Dodes in "The Mysterious Placebo" (SI, January/February 1997) states: "Research shows that the placebo effect can be greater and is far more ubiquitous than commonly thought." My favorite observation on this phenomenon comes from an exasperated Martin Gardner in *Fads and Fallacies in the Name of Science* who observes, in discussing Scientology: "Of all the defenses which can be made of dianetics, the defense that 'it works' is the most irreverent. It is irreverent because in the cure of neurotic symptoms, *anything* in which a patient has faith will work."

So is it rational to observe a superstition that is believed to confer health? One must admit the possibility that such a superstition could contribute to a feeling of health and thus be rational from the point of view of the subject, especially if it is inexpensive. Because the human organism as a whole has an odd relationship to rationality, an unusual belief might "reflect reality" of some sort. This is fully independent of the bounded nature of our conscious rationality.

Jack Reinoehl
Hillsdale, Michigan

Konrad Talmont-Kaminski suggests superstition's ubiquity is natural and never ending. Hopefully he is wrong, unless we are hardwired for religion as some propose—a concept discarded by a growing number as mere psychological manipulation.

Religious superstition may have evolved as a survival mechanism—a protective shield where think-alike obedience was a primary attribute and imperative for continuity of the collective.

That religion is still with us, though no longer essential for tribal defensiveness, perhaps hinges on its brain-contaminating insidiousness, a metamorphosis from virtual insentience and knee-jerk compliance to a guileful brainwashing.

Perhaps a withering away is in works, but in the meantime, to protect humanity from self-destruction, the mitigation of arrogance and self-righteousness in modern-day religion is mandatory. A simmering down of its selfish converting techniques and a replacement by essential humanitarian values is in order—sans superstition.

William R. Lamppa
Embarrass, Minnesota

Is Deception Really Necessary?

I was disturbed by Katherine Merow's article in the July/August 2008 SI ("But You Deceived Me!") concerning the necessity of deception in investigating the paranormal. While there can be some legitimate debate on the question of whether deception is justified in paranormal investigations (see my letter and Joe Nickell's reply in the June/July 2007 SI), it is certainly a mistake to make deception the default investigative technique. Our goal as skeptics should be to gather objective and persuasive evidence about the validity of a particular claim.

I doubt if any of the psychics in Merow's study actually claimed that their psychic abilities were of a type that could prevent them from being deceived by someone intent on doing so. It is patently unfair to criticize people for failing to live up to a claim they never made. For example, would skeptics consider lying to doctors about their symptoms, with the object of getting a diagnosis of a disease

they don't have, a fair test of the medical profession? Of course not. Then how can we expect people to be persuaded when we apply the technique to psychics (and publish the study in our premier journal)?

We should not be training our next generation of skeptical researchers (the study was a student research project funded by the Philadelphia Association for Critical Thinking) to do the equivalent of shooting fish in a barrel but rather to do research that will actually be persuasive to those who do not already share our views. The skeptical community needs to think very carefully about when to apply deception in their investigations and to what extent. Particular attention needs to be paid to how the use of deception affects our image and our credibility to outsiders.

I hope that a future issue of SI can devote some space to a thoughtful consideration of this topic from a variety of perspectives. For now, I encourage SI readers to re-read Karla McLaren's very informative article "Bridging the Chasm between Two Cultures" in the May 2004 issue (available online at www.csicop.org/si/2004-05/new-age.html) and consider whether Merow's study helps to bridge the chasm or to widen it.

John P. Wendell
Kailua, Hawaii

Katharine Merow replies:

Although the psychics I deceived may not have realized they were under scrutiny, it lay well within their "powers" to foil my attempts to debunk them. All they had to do was refuse my request for information about the mystery child, by, for example, declaring their channels blocked by my skepticism (had they been able to detect it). And yet all five furnished me with details about a nonexistent sibling. I did not back the psychics into a corner; they took my money (the Philadelphia Association for Critical Thinking did not, to set the record straight, foot my psychic bills) and told me what they thought I wanted to hear.

As I indicated, though, in my account of the experience, I did not make the decision to employ deception lightly. I struggled with the ethicality of being less than forthright with my unwitting subjects. After much soul-searching, however, I came to view deception not as a "default investigative technique" to be deployed gleefully or with malice but as something of a necessary evil: regrettable but, because of most paranormal practitioners' unwillingness to submit to study, indispensable.

That said, I agree with Wendell and McLaren about the importance of skeptics learning to communicate clearly and noncombatively with those who hold opposing views. If evolutionary biologists are a "flock of dodos" (as the documentary of that name suggests) unable to explain Darwin's theory to creationists in a compelling way, perhaps skeptics are a cackle of hyenas, too busy deriding New Age adherents to mount an honest effort to sell them on scientific inquiry. This is, of course, less than productive.

Expanding on 'When Faith Kills'

The excellent article by Kenneth Krause in your July/August 2008 issue (SI, "When Faith Kills: Christian Healing at the expense of Rational Medicine") points out one of the most tragic consequences of biblical literalism—children dying because their parents treated their illnesses only with prayer. As unfortunate as this practice is, we need to be aware that there is a far more widespread problem regarding "faith healing" and children. Those who die come to the attention of authorities frequently and are consequently publicized, but a great many more cases involve children who eventually recover. After all, most illness and accidents are not fatal and can be cured by a child's natural immune system. However, modern medicine does more than prevent premature deaths; it does a great deal to prevent illness, hasten healing, and alleviate a child's suffering and pain while in recovery. Parents who view doctors antagonistically as the Bible describes them and who follow what the Bible says about healing coming only from God frequently cause maladies to persist, pain to go untreated, and long-term debilitating consequences of what would otherwise be fewer and far less traumatic health problems.

As Krause points out, most states have laws that protect these parents from prosecution, and the cases he cites make a good rationale for changing those laws. Perhaps awareness of how many more children suffer unnecessarily because of such misguided parenting could further strengthen a case for legal reform here.

Anthony Layng
Winston-Salem, North Carolina

Patients' Placebo Response Welcome

In his review (SI, July/August 2008) of *The Mayo Clinic Book of Alternative Medicine,* Dimitry Rotstein dismisses the significance of complementary therapies. He lists the symptoms commonly treated by such therapies and reasons that: "It doesn't take a doctor to realize that all these symptoms have a strong psychological factor, which makes them highly susceptible to the placebo effect." This pejorative attitude toward the placebo response is uninformed.

The placebo response refers to the therapeutic and healing effects of expectancy and intention. This phenomenon is the subject of ongoing research, but most investigators agree that the placebo response is real and potentially powerful.

As a physician, I support my patients' placebo response at every opportunity. Any practical intervention that encourages a patient's natural capacity to heal and combat disease is welcome, especially in the absence of side-effects.

Dr. Rotstein (a physical scientist) is more ready to accept the potential efficacy of herbs and supplements. "After all, chemistry is chemistry." However, such mind/body dualism is no longer credible. Increasing evidence indicates that thoughts and emotions correlate directly with brain events (and thereby have potential to affect the body as a whole).

Mainstream science acknowledges that psychological factors can play a role in both the incidence and outcome of physical illness. It is illogical to reject complementary therapies simply because their mode of action may be through the mind (and brain).

Lucinda Sykes, MD
Toronto, Ontario
Canada

Fallacy of Misplaced Rationalism?

Regarding "The Fallacy of Misplaced Rationalism" (SI, July/August 2008), I'd like to thank Robert Sheaffer for providing such a fitting name for this fallacy. I know exactly what is meant by misplaced rationalism. A while ago, someone told me that ancient Egyptians implemented the so-called "Mummy's Curse" by building the pyramids over large uranium deposits, so the curse isn't mystical, but physical. Of course, such confabulation is pure nonsense, and a perfect example of misplaced rationalism. I used to call it "materialistic but unscientific explanation." Doesn't sound as good, does it? And a catchy name is very important.

For years I've been trying to explain to

people that the Face on Mars and many other similar things are simply mind tricks—our minds are "programmed" to see images in random patterns and so on. Such long sentences made of simple words don't convince many. Nowadays I simply state: "Ah, yes, it's called pareidolia." Just hearing such a cool word converts some people on the spot.

I can't wait to use the term "misplaced rationalism" now. Of course, it's just another kind of fallacy in itself: "If they named it, then it must be real." Pseudoscientists often use (or rather abuse) scientific terminology to get exactly this kind of effect. I call it the Big Words Fallacy, but perhaps someone can think of a better name.

Dimitry Rotstein
Haifa, Israel

Are Scientific Theories 'True'?

In his interesting column ("Alternative Science," SI, July/August 2008), Massimo Pigliucci refers to the debate between realism and instrumentalism in the philosophy of science. Pigliucci correctly defines instrumentalism as the view that scientific theories should be construed as instruments for predictive and manipulative success of the world and not as "true" descriptions of the world, as most realists assert.

In addition to Kyle Stanford's argument of alternative theories unconceived by past scientists at the time, Pigliucci also canvasses other instrumentalist arguments. Pigliucci mentions the "underdetermination of theory by the evidence," leading to the possibility of the same evidence supporting two or more theories. He then refers to the "pessimistic meta-induction": that is, since most of our past scientific theories are now considered false, then most of our current and future theories will likely turn out false as well.

Pigliucci, however, seemingly takes comfort in the realist reply that if our scientific theories were not true descriptions of reality, then their instrumental success and the successful technologies amassed from them would be an astounding coincidence. But the earlier-mentioned pessimistic meta-induction indicates that there can be no convincing correlation between the truth of a scientific theory and its predictive and explanatory success, for the history of science is filled with scientific theories that also possessed predictive and explanatory success but which are now considered "false." It is not too difficult to imagine "true" current scientific theories underpinning our successful technologies, such as quantum mechanics, being supplanted by future possible theories, such as string theory.

As most philosophical empiricists would claim, our scientific theories can do no more than explain, predict, and manipulate our sensory experiences, thereby allowing us to develop our technologies. Any attempt to extend beyond sensory experience by proclaiming scientific theories as "true" descriptions of reality is nothing more than metaphysics.

Rui Vieira
Mississauga, Ontario
Canada

Massimo Pigliucci replies:

I agree with most of what Mr. Vieira says, but I do not accept the extreme extrapolation from the "meta-induction" about the history of science for a simple reason. Instead of seeing every past scientific theory as simply wrong, one could see it as only partially right, moving from simple modal logic (true/false) to probabilistic, fuzzy logic. In that context, there is no contradiction between saying that previous theories were (partially) wrong and claiming that science is making progress: science progresses by producing less and less "wrong" theories of the world.

Consider Vieira's own example of a possible transition from quantum mechanics to string theory (which, by the way, is anything but certain, as there are competitors to string theory). String theory is not a negation of quantum mechanics, but a deeper-level theory. Quantum particles still exist in string theory, but they are not the ultimate foundations of reality, because they are in turn being produced by the vibrations of the strings themselves. Thus the old theory, quantum mechanics, if abandoned, would not have been wrong, just partially right.

As for the jab at metaphysics, I have no problem with the fact that these discussions hinge on metaphysical assumptions, so does science itself, for instance in assuming naturalism—the idea that the world can be understood without recurring to the supernatural. Not all metaphysics is nonsense.

Defending SI's Reporting on Religious Hucksters

I am writing in regard to comments made by Rev. Ian Alterman in the July/August 2008 issue's "Letters to the Editor" section. In his letter, Mr. Alterman chastises SI for reporting on the downfall of Richard Roberts and the Congressional investigation of so-called "Prophets," because, as Mr. Alterman puts it, SI's *raison d'etre* is exploring issues related to science.

I have to disagree. SKEPTICAL INQUIRER advertises itself as "The Magazine for Science and Reason." While the shenanigans of religious hucksters may not fall into the scientific category, they do merit a place in the magazine when it comes to reason. These people are little more than common thieves and con men who ply their trade by exploiting the fears and beliefs of the unsuspecting faithful, and as such they most certainly deserve to be shown for what they are.

I applaud SKEPTICAL INQUIRER for its continued efforts in exposing these frauds, whose existence and operations fly in the face of science and reason and cause untold damage for their unwitting parishioners.

Michael LaPointe
Costa Mesa, California

Reading SI Cover to Cover

I have never before read a magazine from cover-to-cover until I subscribed to the SKEPTICAL INQUIRER. First, of course, is the delicious content of the articles; however, there is a secondary and very important reason for my dedication to your publication. *I don't have to succumb to, be revolted by, or busy my mentality to sorting out the googol of commercial/self-help ads found in other "scientific" and/or informative magazines.* By the time I've skirted their sales pages and torn out numerous finger-numbing mailers, my interest in anything and everything has waned.

The letters column is a forum for views on matters raised in previous issues. **Letters should be no longer than 225 words.** Due to the volume of letters we receive, not all can be published. Send letters as e-mail text (not as attachments) to letters@csicop.org. In the subject line, provide an informative identification, e.g.: "Letter re: Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122, or fax it to 505-828-2080.

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United States

ALABAMA. Alabama Skeptics, Alabama. Emory Kimbrough. Tel.: 205-759-2624. 3550 Watermelon Road, Apt. 28A, Northport, AL 35476 US.

ARIZONA. Tucson Skeptics Inc. Tucson, AZ. James McGaha. E-mail: JMCGAHA@PimaCC.Pima.EDU. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715 US. **Phoenix Skeptics**, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082 US.

CALIFORNIA. Sacramento Organization for Rational Thinking (SORT) Sacramento, CA. Ray Spangen-burg, co-founder. Tel.: 916-978-0321; e-mail: kitray@quiknet.com. PO Box 2215, Carmichael, CA 95609-2215 US. www.quiknet.com/~kitray/index1.html. **Bay Area Skeptics** (BAS) San Francisco—Bay Area. Tully McCarroll, Chair. Tel.: 415 927-1548; e-mail: tullyann@pacbell.net. PO Box 2443 Castro Valley, CA 94546-0443 US. www.BASkeptics.org. **Independent Investigations Group (IIG),** Center for Inquiry–*West*, 4773 Hollywood Blvd, Los Angeles, CA 90027 Tel.; 323-666-9797 ext. 159; Web site:www.iigwest.com. **Sacramento Skeptics Society**, Sacramento. Terry Sandbek, President. 4300 Auburn Blvd. Suite 206, Sacramento CA 95841. Tel.: 916 489-1774. E-mail: terry@sandbek.com. **San Diego Association for Rational Inquiry** (SDARI) President: Paul Wenger. Tel.: 858-292-5635. Program/general information 619-421-5844. Web site: www.sdari.org. Postal address: PO Box 623, La Jolla, CA 92038-0623.

COLORADO. The Denver Skeptics Meetup Group. Elaine Gilman, President. Skype address: elaine.gilman. 965 S. Miller Street, 302, Lakewood, CO 80226. Web site: http://skeptics.meetup.com/131/.

CONNECTICUT. New England Skeptical Society (NESS) New England. Steven Novella M.D., President. Tel.: 203-281-6277; e-mail: board@theness.com. 64 Cobblestone Dr., Hamden, CT 06518 US. www.theness.com.

D.C./MARYLAND. National Capital Area Skeptics NCAS, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: 301-587-3827. e-mail: ncas@ncas.org. PO Box 8428, Silver Spring, MD 20907-8428 US. http://www.ncas.org.

FLORIDA. Tampa Bay Skeptics (TBS) Tampa Bay, Florida. Gary Posner, Executive Director. Tel.: 813-849-7571; e-mail: tbs@cfiflorida.org; 5201 W. Kennedy Blvd., Suite 124, Tampa, FL 33609 US. www.tampabayskeptics.org. **The James Randi Educational Foundation.** James Randi, Director. Tel: (954)467-1112; e-mail jref@randi.org. 201 S.E. 12th St. (E. Davie Blvd.), Fort Lauderdale, FL 33316-1815. Web site: www.randi.org.

IOWA. Central Iowa Skeptics (CIS) Central Iowa, Rob Beeston. Tel.: 515-285-0622; e-mail: ciskeptics@hotmail.com. 5602 SW 2nd St. Des Moines, IA 50315 US. www.skepticweb.com.

ILLINOIS. Rational Examination Association of Lincoln Land (REALL) Illinois. Bob Ladendorf, Chairman. Tel.: 217-546-3475; e-mail: chairman@reall.org. PO Box 20302, Springfield, IL 62708 US. www.reall.org.

KENTUCKY. Kentucky Assn. of Science Educators and Skeptics (KASES) Kentucky. 880 Albany Road, Lexington, KY 40502. Contact Fred Bach at e-mail: fredwbach@yahoo.com; Web site www.kases.org; or (859) 276-3343.

LOUISIANA. Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM) Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808 US.

MICHIGAN. Great Lakes Skeptics (GLS) SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; e-mail: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366 US. **Tri-Cities Skeptics**, Michigan. Gary Barker. Tel.: 517-799-4502; e-mail: barkerg@svol.org. 3596 Butternut St., Saginaw, MI 48604 US.

MINNESOTA. St. Kloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC) St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; e-mail: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State University, St. Cloud, MN 56301 US.

MISSOURI. Skeptical Society of St. Louis (SSSL) St. Louis, Missouri. Michael Blanford, President. E-mail: info@skeptically.org. 2729 Ann Ave., St. Louis, MO 63104 US. www.skepticalstl.org.

NEVADA. Skeptics of Las Vegas, (SOLV) PO Box 531323, Henderson, NV 89053-1323. E-mail: rbanderson@skepticslv.org. Web site: www.skepticslv.org./.

NEW MEXICO. New Mexicans for Science and Reason (NMSR) New Mexico. David E. Thomas, President. Tel.: 505-869-9250; e-mail: nmsrdave@swcp.com. PO Box 1017, Peralta, NM 87042 US. www.nmsr.org.

NEW YORK. New York Area Skeptics (NYASk) metropolitan NY area. Jeff Corey, President. 18 Woodland Street, Huntington, NY 11743, Tel: (631) 427-7262 e-mail: jcorey@liu.edu, Web site: www.nyask.com. **Inquiring Skeptics of Upper New York** (ISUNY) Upper New York. Michael Sofka, 8 Providence St., Albany, NY 12203 US. **Central New York Skeptics** (CNY Skeptics) Syracuse. Lisa Goodlin, President. Tel: (315) 446-3068; e-mail: info@cnyskeptics.org, Web site: cnyskeptics.org 201 Milnor Ave., Syracuse, NY 13224 US.

OHIO. Central Ohioans for Rational Inquiry (CORI) Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; e-mail: charlie@hazlett.net. PO Box 282069, Columbus OH 43228 US. **South Shore Skeptics** (SSS) Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; e-mail: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 US. www.southshoreskeptics.org/. **Association for Rational Thought** (ART) Cincinnati. Roy Auerbach, president. Tel: 513-731-2774, e-mail: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212 US. www.cincinnati skeptics.org.

OREGON. Oregonians for Science and Reason (O4SR) Oregon. Jeanine DeNoma, president. Tel.: (541) 745-5026; e-mail: wilkinsa@peak.org; 39105 Military Rd., Monmouth, OR 97361 US. Web site: www.04SR.org.

PENNSYLVANIA. Philadelphia Association for Critical Thinking (PhACT), much of Pennsylvania. Eric Krieg, President. Tel.: 215-885-2089; e-mail: erickrieg@verizon.net. By mail C/O Ray Haupt 639 W. Ellet St., Philadelphia PA 19119.

TENNESSEE. Rationalists of East Tennessee, East Tennessee. Carl Ledenbecker. Tel.: 865-982-8687; e-mail: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777 US.

TEXAS. North Texas Skeptics NTS Dallas/Ft Worth area, John Blanton, Secretary. Tel.: 972-306-3187; e-mail: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794 US. www.ntskeptics.org.

VIRGINIA. Science & Reason, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529 US.

WASHINGTON. Society for Sensible Explanations, Western Washington. Tad Cook, Secretary. E-mail: K7RA@arrl.net. PO Box 45792, Seattle, WA 98145-0792 US. http://seattleskeptics.org.

PUERTO RICO. Sociedad De Escépticos de Puerto Rico, Luis R. Ramos, President. 2505 Parque Terra Linda, Trujillo Alto, Puerto Rico 00976. Tel: 787-396-2395; e-mail: Lramos@escepticospr.com; Web site www.escepticor.com.

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Tel.: (312) 226-0420

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Tel.: (317) 423-0710

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3777 49th Street SE, Grand Rapids, MI 49512
Tel.: (616) 698-2342

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Tel.: (212) 504-2945

SAN FRANCISCO
E-mail: sf@centerforinquiry.net

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Tel.: (813) 849-7571

WASHINGTON, DC
621 Pennsylvania Ave. SE, Washington, DC 20003
Tel.: (202) 546-2330

WEST
4773 Hollywood Blvd., Hollywood, CA. 90027
Tel.: (323) 666-9797

ARGENTINA
Av. Santa Fe 1145 - 2do piso, (C1059ABF)
Buenos Aires, Argentina
Tel.: +54-11-4811-1858

CHINA
China Research Institute for Science
Population, NO. 86, Xueyuan Nanlu Haidian Dist., Beijing, 100081 China
Tel.: +86-10-62170515

EGYPT
44 Gol Gamal St., Agouza, Giza, Egypt

FRANCE
Dr. Henri Broch, Universite of Nice, Faculte des Sciences, Parc Valrose, 06108, Nice cedex 2, France
Tel.: +33-492-07-63-12

GERMANY
Kirchgasse 4, 64380 Rossdorf, Germany
Tel.: +49-6154-695023

INDIA
A 60 Journalist colony, JubileeHills, Hyderabad-500033, India
Tel.: +91-40-23540676

LONDON
Conway Hall, 25 Red Lion Square, London WC1R 4RL, England
E-mail: slalvani@centerforinquiry.net

NEPAL
Humanist Association of Nepal, PO Box 5284, Kathmandu Nepal
Tel.: +977-1-4413-345

NEW ZEALAND
E-mail: bcooke@centerforinquiry.net

NIGERIA
PO Box 25269, Mapo, Ibadan, Oyo State, Nigeria
Tel.: +234-2-2313699

ONTARIO
216 Beverley Street, Toronto, Ontario, M5T 1Z3, Canada
Tel.: (416) 971-5676

PERU
D. Casanova 430, Lima 14 Peru
E-mail: cipsiperu@yahoo.com

POLAND
Lokal Biurowy No.8, 8 Sapiezynska Sr., 00-215, Warsaw, Poland

RUSSIA
Dr. Valerii A. Kuvakin, 119899 Russia, Moscow, Vorobevy Gory, Moscow State University, Philosophy Department

SENEGAL
PO Box 15376, Dakar – Fann, Senegal
Tel.: +221-501-13-00